FLIGHT

MAGAZINE

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DECEMBER 1951

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300-MPH. BEECHCRAFT T-36 TRAINER

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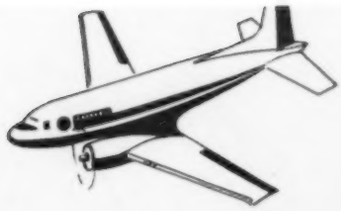

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Portable Automatic Diluter Demand Oxygen Walk-Around Assembly.

Standard equipment on U.S.A.F. bombers, cargo and personnel carriers. New units in production and available to airplane manufacturers.

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U. S. A. F. Type A-1 Cylinder and Regulator Assembly consists of: U. S. A. F. Type A-15 Low Pressure Diluter Demand Oxygen Regulator. (Designed and produced by Scott. Automatically mixes air and oxygen, supplying correct air-oxygen ratio for all altitudes up to 34,000 feet.)

AND . . . U. S. A. F. Type A-6 Low Pressure Portable Oxygen Cylinder.

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for Passenger Comfort and Protection as Supplementary Oxygen.

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Portable
DUAL-PURPOSE EQUIPMENT

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When trouble comes, the pilot pulls a trigger; the rest happens automatically. Ejection seat and pilot are shot clear of the plane; the small drogue chute attached to the seat stabilizes and slows down the speed of the seat and pilot. The pilot then releases himself from the seat, pulls the rip-cord which opens his parachute, and descends safely to earth.

PIONEER PARACHUTE COMPANY, INC.
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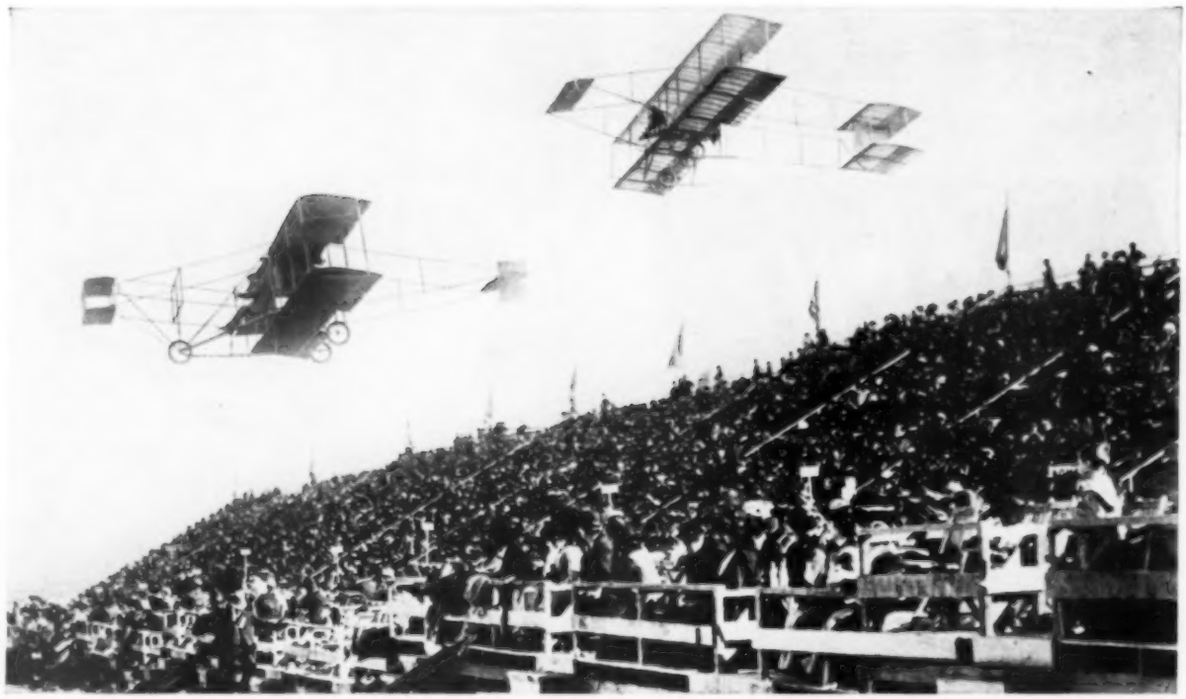
When 55 M.P.H. *was Fast!*



At the first Air Meet at Los Angeles, Glenn Curtiss won the speed race. At this same meet Curtiss established a new speed record of fifty-five miles per hour, "carrying a passenger."

The Sabre-Jet is one of the AF's front line fighters. Powered with a GE turbo jet, the Sabre has a tactical radius of 500 miles and its speed is well up in the "over-600-mph" class

The baby science, aviation, was just stretching its wings in 1910. And if a "record speed of 55 mph" seems incredibly slow today, it is because of the tremendous progress aviation has made in the last 40 years! Improvements in design, size, speed, and endurance of planes have been matched by equally important, but less obvious, developments in aviation fuels.

Phillips research chemists have contributed substantially to the development of modern aviation fuels . . . high-octane gasolines, turboprop and jet fuels. Growing up with the aviation industry, Phillips Petroleum Company is today one of the largest suppliers of dependable aviation products for private, commercial and military planes.

Aviation Division, Phillips Petroleum Company, Bartlesville, Okla.

Phillips 66

AVIATION PRODUCTS

MEMORIAL TO THE LATE WALTER H. BEECH, founder of Beech Aircraft, was unveiled on November 11 in Wichita by Lt. Gen. James H. Doolittle, lifelong friend of the manufacturer. The 15-ft. stone and bronze memorial stands on the factory grounds. Over 10,000 Beechcrafters and their families attended. —(Beech Aircraft Photo.)

AIR Report
Significant Trends and News

TENTATIVE 1952 LIGHTPLANE PRODUCTION PLANS, based on materials allocations, indicate 2,537 planes to be built by the six factories which delivered most of this year's planes; 599 to be built by firms just getting production volume under way, and 119 helicopters of which 104 would be civilian-model McDonnell jet 'copters. Of the 2,537-plane "backbone," all but 114 would be produced by the "Big Three"—1,177 for Piper (661 Pacers plus 516 Super Cubs); 676 for Cessna (580 Model 170's plus 96 Model 190's), and 570 for Beech (408 Bonanzas, 114 Twin-Bonanzas and 48 D-18's). Other production allocations include 93 Aero Commanders, 48 Bellancas, 12 Callairs, 138 Helio Couriers, 54 Mooneys, 270 T-Crafts and 98 Regent Rockets.

IMPENDING SHORTAGE OF ALL AVIATION FUEL AND LUBRICANTS may force imposition of allocations, especially on air transport, in 1952. Airline expansion program may be drastically affected, according to competent petroleum industry spokesmen who are more concerned with the seriousness of the situation than the airline operators appear to be.

FOUR-PLACE MOONEY TRICYCLE is being considered for immediate development by Mooney Aircraft of Wichita, Kansas. Al Mooney would give it the efficiency and features he designed into the single-seat Mooney Mite. Engine might be 145-hp. Continental with 150-mph. cruising speed.

FIRST FLIGHT TESTS OF CONTINENTAL TURBOMECA TURBINE may be in a Cessna 190 as a military demonstration.

BIGGEST NEWS IN MULTI-ENGINE EXECUTIVE CONVERSION FIELD is Grand Central Aircraft's engineering of outer-wing-panel auxiliary fuel tanks of 204 gals. each for DC-3. First such installation was made last month in a Standard Oil of New Jersey DC-3 (see page 20 of this issue). Outer wing tanks boost total available fuel capacity to over 1,200 gals., adding 4 hrs. of range.

EXECUTIVE CONVAIR MODEL 340 TRANSPORTS have been ordered by several firms, and AiResearch

(Continued on page 26)

FLIGHT MAGAZINE
Including SOUTHERN FLIGHT and MODERN AIRPORTS

DECEMBER, 1951 VOL. 36, No. 6

COVER: Here's first USAF-approved sketch of Beech Aircraft's new 300-mph. T-36 trainer-transport on order for the U. S. Air Force and being produced by Beech in Wichita, Kansas, and by Canadair, Ltd., in Montreal. Trainer version has crew of four—three students and an instructor. As a transport, it will have crew of two and seats for 12 passengers. Engines are Pratt & Whitney R-2800's rated at 2,300 hp. for take-off. Span is only 72 ft., length 52 ft. 2 ins., and height 21 ft. 5 ins. Maximum take-off gross weight is over 25,000 lbs. Service ceiling of 34,000 ft., and 650-mile combat radius are only additional details not "classified" against release, says Beech.
—(Beech Aircraft Picture.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager, P. O. Box 750 (1901 McKinney Ave.), Dallas, Texas
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Incomparable

a pretty girl

Should she keep that bracelet he sent her? Or should she send it back? Well, the jewelry is nice and, as a matter of fact, he's not so bad either. Besides, it's Christmas and folks should be good to one another. Valerie Duncan is 25, has dark brown eyes to match her dark brown hair. She is a secretary for an oil company, likes to swim and dance. (No. 3 in a series of pretty Dallas girls discovered and photographed especially for Southwest Airmotive.)

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LOVE FIELD • DALLAS

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Just among ourselves

EDITORIALS

FACTORIES PLEDGE CONTINUED LIGHTPLANE OUTPUT

FIVE manufacturers are on record as insisting that they will continue to produce lightplanes for civilian owners and operators as long as materials and supplies make it possible to do so. They gave such assurances at the recent annual convention of the National Aviation Trades Association in Fort Worth, Texas. We join with NATA members in applauding these five manufacturers for their determined stand in behalf of civil aviation now and for their record of having stayed with civil aviation throughout the current emergency and its increasing difficulties. We refer to Aero Design & Engineering, which has developed and is producing the twin-engine Aero Commander; Beech Aircraft, which has developed and is producing the Twin-Bonanza in addition to the Model C-35 Bonanza and D-18S Twin; Cessna Aircraft, which is producing the 4-pl. Model 170 and the 5-pl. Model 190 series; Piper Aircraft, which is producing the 2-pl. Cub series and the 4-pl. Pacer series, and Taylorcraft, which has revived its 2-pl. production, is offering its 4-pl., and is active in development of a lightweight, air-cooled Diesel for lightplanes.

All five of these manufacturers were represented at the NATA convention. What they had to say ran something like this:

Aero Design: Rufe Amis, president, reported his Oklahoma City factory has actually turned down several subcontracts for military orders, preferring to concentrate all of its facilities on the production of 47 Aero Commanders for which firm orders have been received.

Beech: John Brownlee, San Antonio Beechcraft distributor (Alamo Aviation), appeared as personal representative of Mrs. Olive Ann Beech, president of Beech Aircraft, and reiterated earlier Beech pledges to continue producing civil aircraft. He said Beech delivered 342 Bonanzas and 51 D-18S's during its fiscal 1951, this being 92 per cent of its 1950 deliveries. Beech is now well along with its Twin-Bonanza, and will produce and deliver 100 of them during 1952 beginning in March.

Cessna: Factory Service Manager Ozzie Kangas repeated his firm's pledge to stay with civil aviation even though Cessna's military production has increased tremendously. Civilian Cessna production in 1950 was 92 per cent of the factory production, but in 1951 only 12 per cent of it was civilian output although this civilian business equalled that of the preceding year in dollar volume. Incidentally, Cessna's sales of spares this year is running 35 per cent over last year.

Piper: W. T. Piper was most optimistic. He said, "We have materials for production now and we expect to continue having adequate materials—in fact, I expect a loosening up of the materials situation." His factory, too, is producing military orders, including contracts for Bell, Grumman, Lycoming and others. Piper said success of his Pacer models had convinced him that 4-place airplanes will continue to dominate the market because they offer more transportation and utility than smaller ones. "The 2-pl. airplane is entirely out of the picture except for special purposes," he said. "I believe that the 4-pl. will even replace the 2-pl. models in civilian pilot training."

Taylorcraft: Al Bennett, vice president and sales manager, announced its 4-pl. Tourist was set for production with deliveries beginning next Spring. The 2-pl. Taylorcraft Sportsman with 85-hp. engine is being delivered now. Taylorcraft's new tandem, which can take 85, 90 or 125-hp. engines, will be NC'ed "when we see sufficient market for it," Bennett said. He said the revived Taylorcraft firm is cooperating in every way with Diesel Power, Inc., which is developing an air-cooled Diesel engine for lightplanes. A T-Craft is being used for flight tests, which are well under way.

These are uncertain times and operators attending the NATA sessions were encouraged both by the statements and the presence of the five manufacturers and their representatives. They realize, certainly more than most of us, that any future cessation of civilian lightplane production will be damaging to all of aviation. Keeping it alive and supplying the needs of essential users of aviation involves but a fraction of one per cent of aircraft materials necessary to meet military requirements. The essentiality of continued civil lightplane production was officially confirmed last summer, when production of 3,500 planes per year was authorized as compared to the limitation of 2,500 planes which had been authorized in previous government planning.

Assurances by manufacturers that this production will continue is predicated on the continued availability of necessary materials and supplies. Existing allocations and military planning provide for continuance of materials.

Frankly, we have been concerned over the possibilities of military orders crowding civilian lightplanes out of production. These airplanes provide vital transportation to essential users in the furtherance of countless activities closely geared to national defense. We have emphasized on many occasions in these columns the necessity for preserving useful civilian flying and all of the facilities necessary for its continuance. We have also joined in Washington efforts which successfully convinced military authorities of this need and its soundness, working in behalf of materials allocations which have now been made.

Renewed pledges by the manufacturers of their determination to stick by so-called "little aviation" come as a significant development. With their continued faith and determination, civil aviation can contribute increasingly to the national welfare.

★ ★ ★

solid cross-country performance *plus economy!*

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They make plane ownership practical for the first time for many businesses and individuals. And the Tri-Pacer, with simplified controls and tricycle landing gear, makes flying so easy that people have soloed after only one day of instruction.

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MUCH NEW FOR '52. Many fine new features for added performance and comfort are incorporated in the Pacer and Tri-Pacer for 1952. See your Piper dealer or write for Pacer brochure to Dept. F-12.

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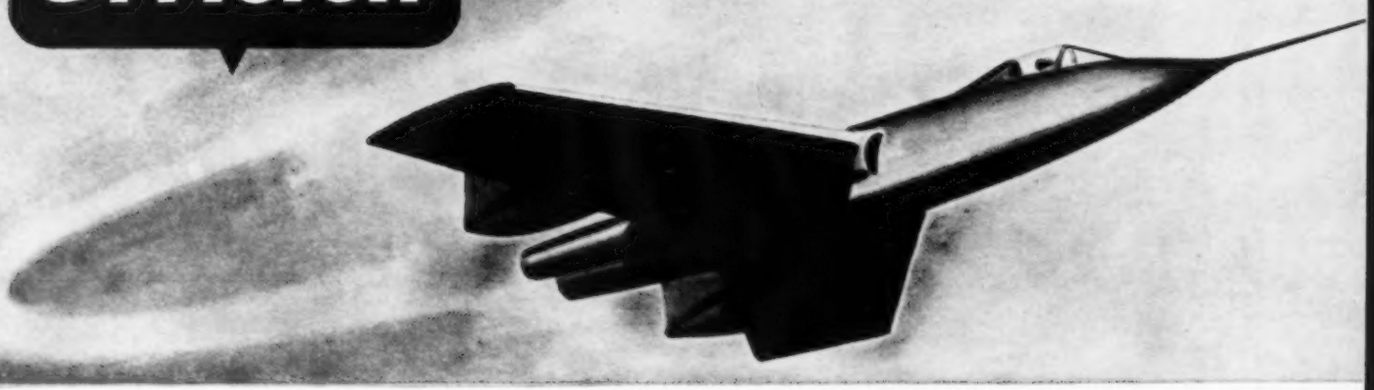

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In the last several months TEMCO has been selected by Boeing, Douglas, Lockheed and Martin to build major assemblies and components for their newest military airplanes.

The T-35 Buckaroo was completely designed and developed by TEMCO. It is now being tested by the Air Force as a trainer and by the Ground Forces as a highly maneuverable support weapon.

TEMCO has the experience, TEMCO has the facilities—and TEMCO has the administration that assures their proper application *to Aircraft*.

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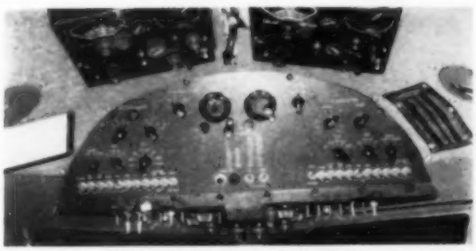

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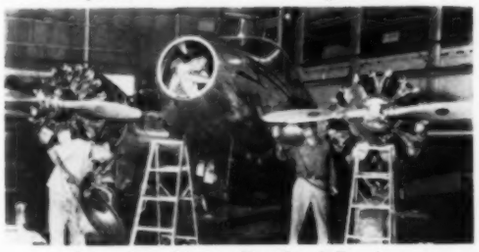

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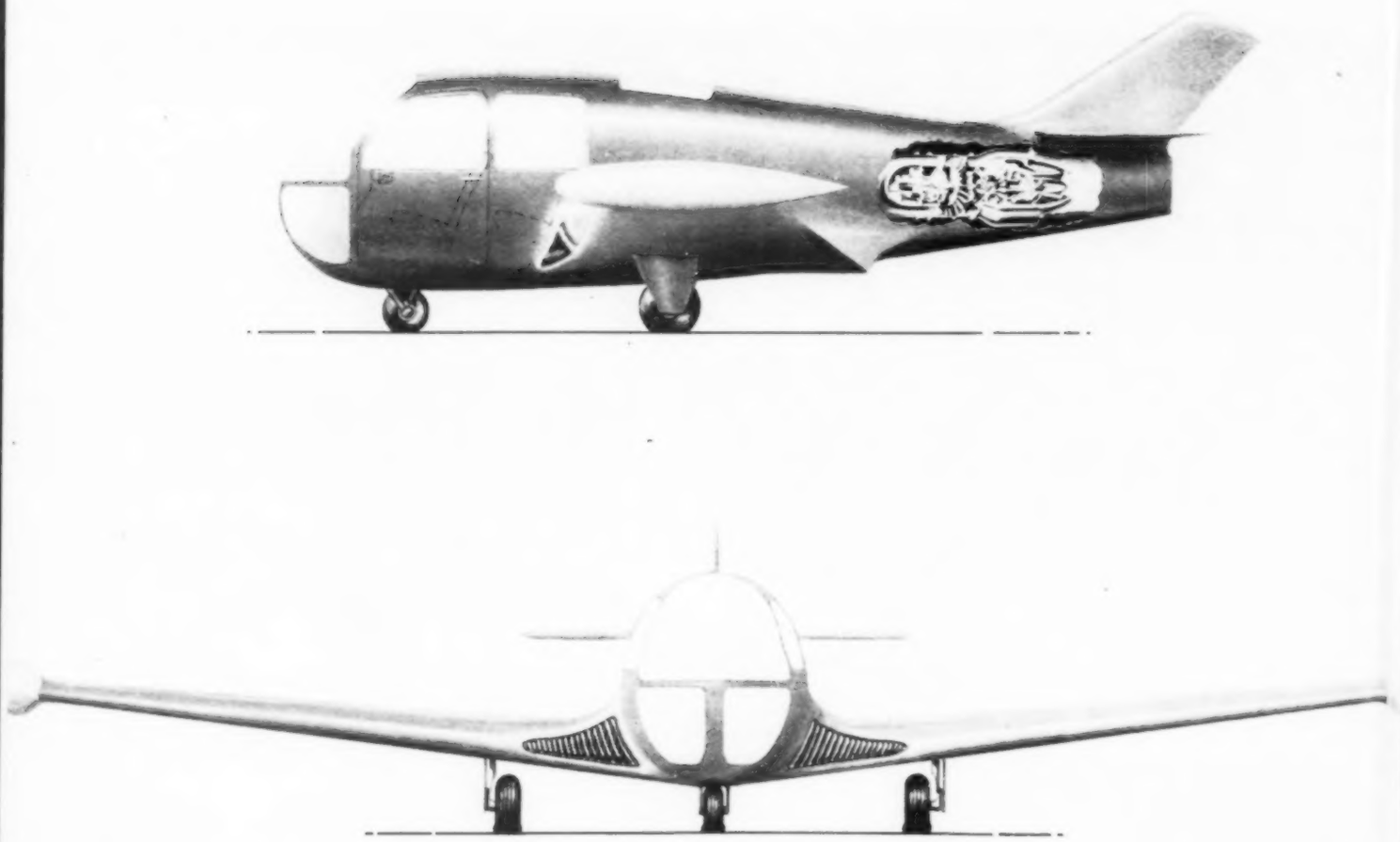
and the reaction turbo jet is produced

utilization of private planes by busi-

such as weight and small frontal area to justify the application.



Single-jet 4-place airplane for private owners would be powered by Continental-Turbomeca "Aspin" ducted fan, shown in empennage cutaway. Performance would include 300-mph. maximum speed, 270-mph. cruise and 680-mi. range. Cabin pressurization for 20,000-ft. altitude cruising is provided. Note wing-tip fuel tanks. Cost is estimated by Continental Engineer Carl Bachle at about $22,000.
—(Continental Motors Sketch.)

Continental's Jet Challenge

Will the industry design 300-mph. lightplanes around Continental's turbines?

Engineer Bachle's idea for a 400-500-mph. trainer powered by two Continental-Turbomeca "Marbore" jets of 880 lbs. of thrust each.
—(Continental Motors Sketch.)

FLYING business men pilots and owners of private airplanes have visualized the airplanes sketched on these two pages for several years. The dream planes pictured here may be closer to reality than most observers are prone to believe—these sketches are from Continental Motors and incorporate turbines which that manufacturer now has and will manufacture to order.

No aircraft manufacturer has any such designs as these in the works, as far as FLIGHT MAGAZINE can learn. But Continental does have the turbine power plants around which the designs were sketched. The power plant in the large sketches is the Continental-Turbomeca *Aspin*, a ducted fan. Thrust from both a shaft-driven fan

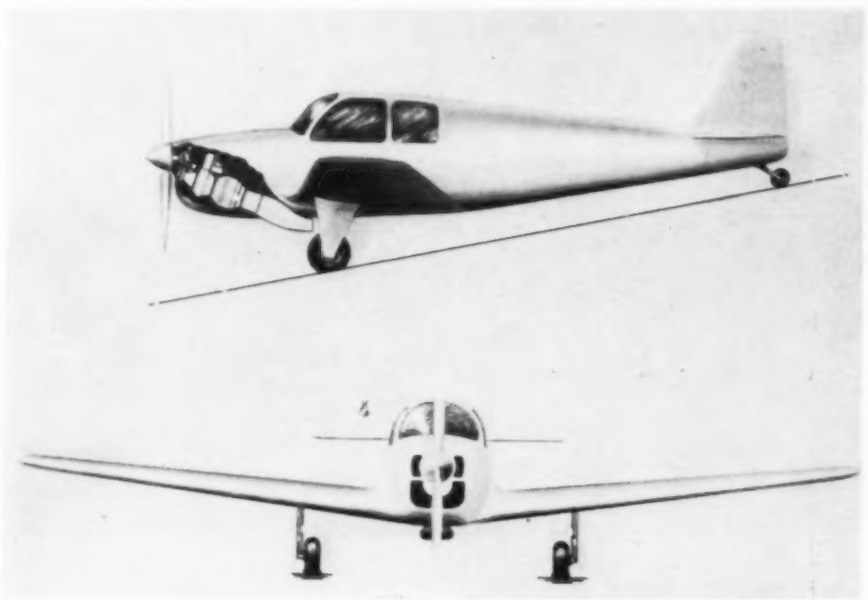
and the reaction turbo jet is produced by the *Aspin*, which is available in two versions. The Mark I produces 528 lbs. of thrust for take-off and 350 lbs. for cruising, and the Mark II version produces 790 lbs. of thrust for take-off and 660 lbs. for cruising. The turbine driving a propeller in the small sketch is another Continental-Turbomeca, the *Artouste*, available in 280-hp. and 400-hp. ratings, while the tandem 2-place military trainer, in the 400 to 500-mph. category, has two Continental-Turbomeca *Marbore* pure jets rated at 880 lbs. of thrust each.

Turbines such as these can influence profound progress in lightplane performance, safety and comfort. This progress, in turn, can influence greater utilization of private planes by business firms and their executives and personnel.

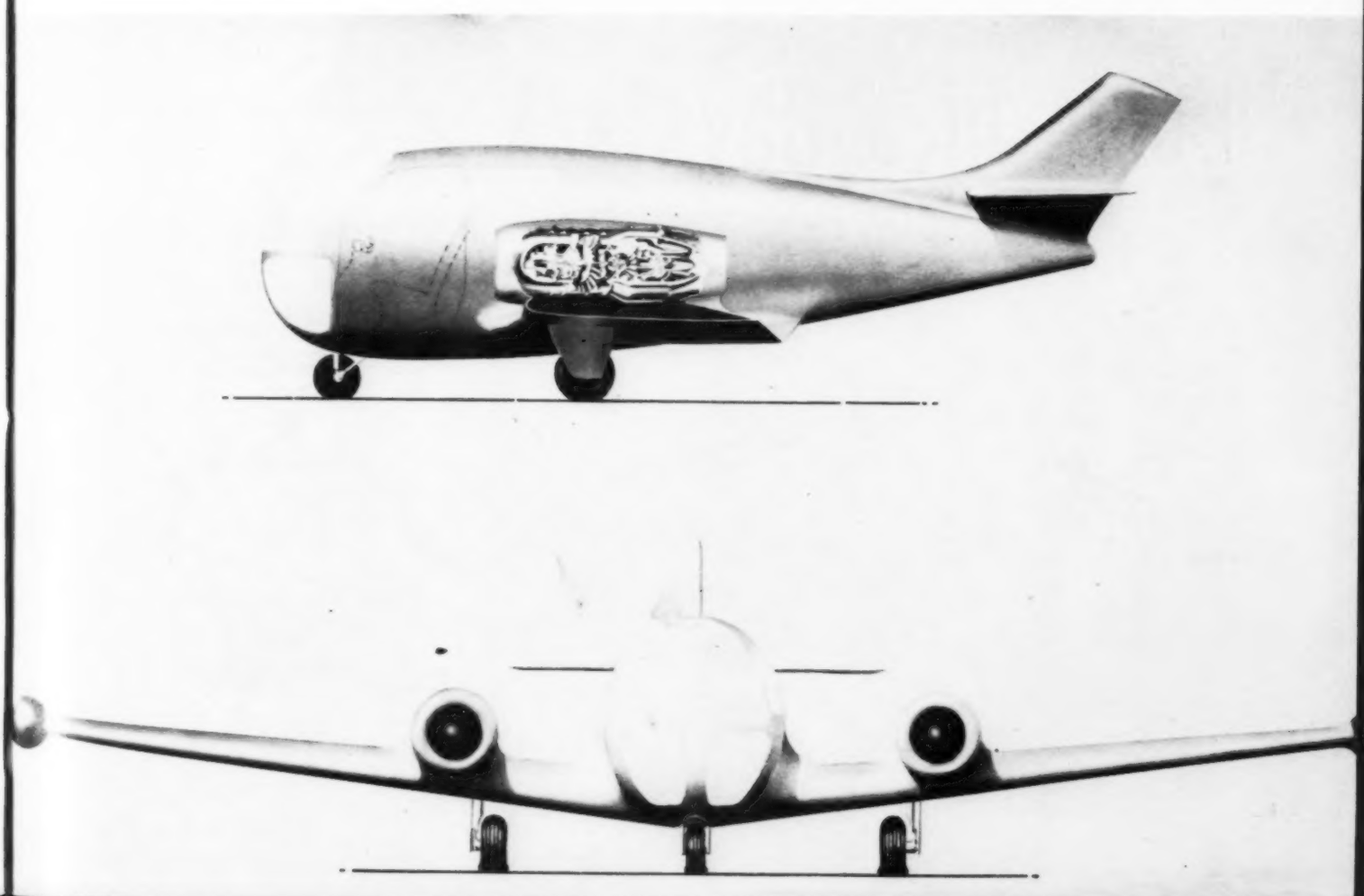
Carl F. Bachle, for many years in charge of airplane engine research for Continental, admits that turbine fuel consumption is greater than that for piston engines. But he expects the two to show little difference "within the foreseeable future." Meanwhile, he sees no reason for delay in applying the small turbine to small airplanes because existing turbines offer superior performance and other advantages such as weight and small frontal area to justify the application.

Bachle's performance and other advantages include the following for the 4-place business man's airplane powered with an *Aspin* ducted fan: Maximum speed, 300 mph.; cruising speed, 270 mph.; cabin pressurization for 20,000-ft. altitudes; engine weight of 304 lbs. or about half the engine weight of the 170-mph. 4-pl. piston-engine airplane, and an airframe weight the same as that of the present-

(Continued on page 38)



Turbine driving propeller at right is Continental-Turbomeca "Artouste," available in 280-hp. and 400-hp. ratings. Twin-jet executive airplane below is powered by two "Aspin" ducted fans for 300-mph. performance. These turbines weigh only 304 lbs. each, are torque free and have only 26-in. diameter.
(Continental Motors Sketch.)



Search and rescue Stinson L-5's of the Civil Air Patrol have strut-carried containers in which supplies can be dropped to disabled aircraft located in isolated areas. CAP also calls in USAF Air Rescue helicopter teams.
—(Texas Wing CAP Photo.)

Needle in a Haystack

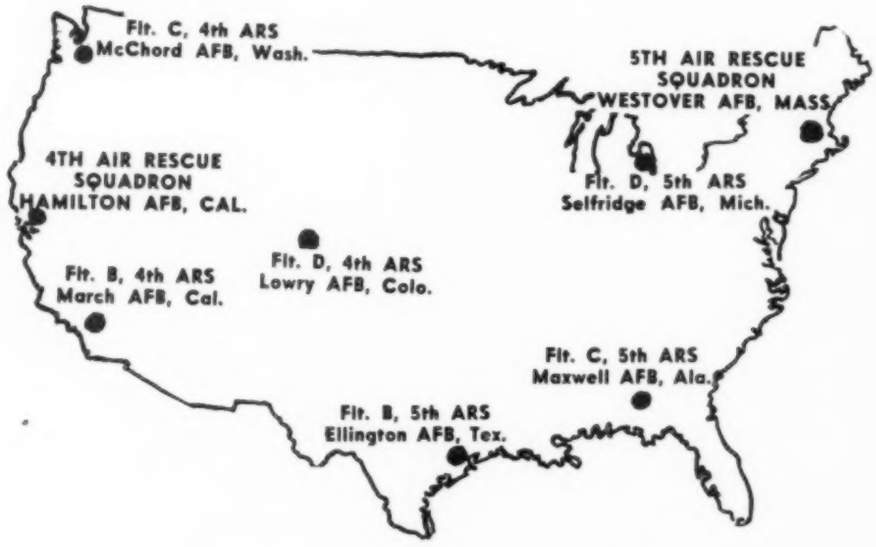
Search and rescue missions serve a worthy cause and offer training

By GEORGE E. HADDAWAY

HOW many times have you been over extra rugged country and said to yourself, "This would be one helluva place for the engine to konk out—they'd never find me"?

It's a normal sort of reaction to bad terrain although, way down deep, most pilots believe it just can't happen to them. But it can, and with more flying going on than ever before, with weather accidents on the increase, itinerant civilian and military pilots might like to know the chances are they will be found. Just how quickly depends largely on themselves — whether they file a flight plan and stick to it. Even if you don't want to take advantage of the free service and security afforded by the flight plan system, they'll still go out and look for you the moment it's determined you're definitely among the missing. However, without a flight plan to go by it's often like looking for a needle in a haystack.

The efficient and highly organized machinery that does the job is known as SARCAP — Search and Rescue, Civil Air Patrol. It's amazing how few people know about this remarkable service that stands in constant readiness to search for missing airmen in a



Search and rescue missions are controlled from these USAF bases. ARS units maintain 24-hour alert and can be called by collect telephone, if necessary, to locate lost civil aircraft. CAP search and rescue operations are coordinated with USAF units.

matter of very few hours after the evidence is conclusive they're missing.

Just the other day a rancher in the Texas hill country thought he saw an airplane go down behind a timbered hill in mighty rugged country. Concerned about the possibility of a crash he called the sheriff and reported the incident. The sheriff called a nearby airport but the local operator-manager reported none of his planes missing. Then the operator discussed the possibility of making a local search himself with a couple of other pilots, but when he couldn't get the rancher on the phone the matter was dropped. As it turned out there actually was a forced landing. The pilot came out unscathed and walked away. But it could have been quite a different story.

How to Trigger a Search

Neither the sheriff nor the airport operator knew of SARCAP or how easy it is to start an investigation, determine the facts, and if necessary, institute at once a search and rescue mission. All they needed to do was to pick up the phone and call the nearest U. S. Air Force Air Rescue Service point, which in this particular case would be ARS, Ellington Air Force Base at Houston, Texas.

There are eight such ARS locations throughout the nation. If you have to, you can even call them collect! The nearest CAA communications station or Civil Air Patrol group also can be called to start the ball rolling. From then on the machinery is set in motion step by step from original evaluation to fan-out communications that immediately gather in all pertinent information regarding the aircraft involved.

ARS control rooms are on a 24-hour basis, 7 days a week, 365 days a year. Their communications and plotting system is practically foolproof. With rivet-hammer rapidity ARS exhausts every means of determining if a pilot is definitely down, flight plan or no.

When the determination is made that the aircraft is missing, a search commander is assigned to the search area. He in turn calls the nearest Civil Air Patrol Wing Headquarters, where the switch is thrown to set the actual search in motion.

During the past two years Civil Air Patrol pilots have become increasingly proficient in the art of search and rescue. As a consequence of this proficiency through specialized training on simulated SARCAP missions CAP is now doing by far the majority of all search and rescue work in continental United States.

We recently attended one of these simulated missions at a U. S. Air Force base and it completely opened our eyes to a little-publicized operation which adds another feather in the cap of Civil Air Patrol in relieving military pilots and aircraft for important work elsewhere, just as they did in World War II on far-flung coastal patrol, border patrol and courier assignments. The only difference is most CAP pilots receive no pay. Except in a few states where appropriations have been made to pay moderate per diem expenses of pilots on such missions, the plane owners receive gas and oil only.

How Missions Operate

The SARCAP training mission we visited brought in 106 airplanes of every size and description from surplus clunkers to the latest models. The

(Continued on page 30)

Hundreds of privately-owned civilian airplanes are participating in Civil Air Patrol-USAF search and rescue training missions throughout the United States. Most are 2-pl. type, as shown here at a recent Texas CAP Wing mission on an Air Force base.
—(Texas Wing CAP Photo.)

This wilderness air strip is one of many from which Hollinger Ungava planes operate in developing Canada's greatest mining venture. It is in a canyon and is seen here from co-pilot's window of a DC-3. —(United Aircraft Photo by Ray Kuhn.)

Canadian Airlift for Iron Ore

No other transport except air could do the job these bush pilots perform

CANADIAN bush pilots, who have worked with the airplane as long as Al Cheesman has done, seldom doubt anything a good flying machine can do. "But I'll tell you the truth," says Al. "I never thought I'd see the day the airplane would build a major railroad and lay open our country's biggest ore mines."

He was squatting on his heels watching a Fairchild C-119 Flying Boxcar land at a construction company's air strip in Labrador. The C-119 was bringing in 16,000 lbs. of power plants for giant tractors. Six hundred workmen toiled around the strip with every variety of engine, tool and equipment. Yet neither linking road nor connecting rail led to this desolate subarctic wilderness. Every man, every nut and bolt, every tractor, drill and jeep had been flown there over an aerial route that extended 317 miles south to the fishing village of Seven Islands on the St. Lawrence River. A railroad is being pushed northward over the route, but

Seven-ton tractors were flown into wilderness by Fairchild C-119 borrowed from USAF. Smaller planes also flew in tractors, but only by disassembling them. —(United Aircraft Photo by Ray Kuhn.)

This is Knob Lake, northern terminus of the Hollinger Ungava airlift. Over 300 miles from the nearest railhead, it is being developed for mining by workmen and materials flown in. Float base is at lower left. Main camp is on opposite shore.
—(United Aircraft Photo by Ray Kuhn.)

won't be completed until 1954. Meanwhile, everything goes by air.

The scene was at Knob Lake, far up on the New Quebec-Labrador line. This is the wilderness location for a $200 million development of one of the world's richest concentrations of iron ore, much of it outcropping on the surface. To tap such wealth requires surmounting of all the handicaps of a barren, remote, untouched land. The only answer is the airplane, and airlift to do the job is being utilized by the developing syndicate, in which the participants are the Hollinger Consolidated Gold Mines, Ltd., of Canada; the M. A. Hanna Company of Cleveland, and six steel companies in the United States. This amalgamation is known as the Iron Ore Company of Canada, and for airlift it has an operating subsidiary known as Hollinger Ungava Air Transport.

Charlie Hoyt, who flew in great amounts of materials and machinery to build the air defense installation at Goose Bay during the war, directs the airlift. He operates twelve airplanes—3 Douglas DC-3's, 2 Noorduyn Norsemen, 2 de Havilland Beavers, a Curtiss C-46, a Canso PBY, a Lockheed Lodestar and a Bellanca. With two exceptions, all of his pilots are former RCAF airmen familiar with the bush before starting this operation.

No other non-airline civilian airlift ever approached the magnitude of the work accomplished by these planes and airmen. This, Canada's greatest mining and newest railroad venture, has been entirely sustained by Charlie Hoyt's air fleet. In one 30-day period recently, in weather where the thermometer ranges from 70 below to 95 above, the Hoyt airlift hauled 3,979,969 lbs. of equipment, material, food

(Continued on page 32)

Two of the airlift's floatplanes are shown at right. Below is Bush Pilot Al Cheesman, veteran Canadian pilot and traffic manager of the airlift.
—(United Aircraft Photos by Ray Kuhn.)

Esso Shipping's newest C-47A conversion looks like any other DC-3 but incorporates many important improvements. Performance, too, is improved—cruising speed at 1,000-ft. and 67 per cent of power is 185 mph. IAS; single-engine rate-of-climb fully loaded from sea level is 500 fpm. at 105 mph. IAS, and outer-wing tanks give added range.
—(Executive Aircraft Service Photo.)

Progress Package for Business Flying

Esso's conversion pioneers significant new DC-3 improvements

By TOM ASHLEY

FAR from being obsolete in meeting the needs of business firms for business air transportation, surplus C-47's and DC-3's have been converted into better airplanes than they were originally. This transformation of good airplanes into even better specialized business machines has now reached the point of significant new improvements in performance, dependability, safety and comfort.

An outstanding example is the C-47A which last month became the latest addition and flagship to the airplane fleet operated by Esso Shipping Company, affiliate of Standard Oil Co. (New Jersey). Considered the most improved converted DC-3 now flying business personnel, this transport features many new developments:

Larger engines.

Jato.

Retractable tail wheel.

Outer wing-panel auxiliary fuel tanks.

Liquid-agent fire extinguishing system.

Sperry engine analyzer.

Empennage cabin heater installation with air intake in the vertical fin.

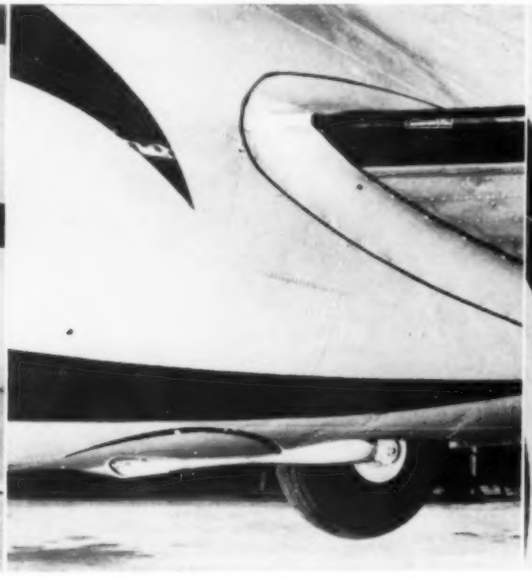
Full-size fold-down sleeping berths.

Latest Collins radio equipment for communications and navigation.

First DC-3 with two large "picture windows" forward of the door.

Many other innovations make the Esso DC-3 a conversion of unusual interest throughout the ranks of business flying. It was completed last month by Executive Aircraft Service Company at Garland Airport in Dallas, the Harry Chase enterprise which formerly operated Dallas Aero Service and has converted over 85 multi-engine aircraft since the war. It is

Esso Douglas pioneers outer-wing fuel tanks, first ever engineered in a DC-3.



Retractable tail wheel developed by Douglas for Super DC-3 adds over 5 mph. to speed.

Air intake for Janitrol cabin heater is in vertical fin, first such DC-3 installation.
—(FLIGHT MAGAZINE Photos by Tom W. Collins.)

Esso's second DC-3 and incorporates ideas from Colonel E. W. Estelle, chief pilot and manager of Esso's air transportation, based on a large amount of executive air fleet operations for Jersey Standard.

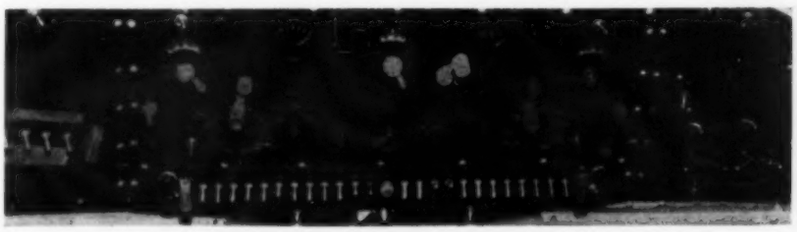
The large engines, for example, were first used successfully on Esso's first Douglas. Extensive engineering in conjunction with Bendix and other suppliers led to carburetor and oil cooler modifications which made the Pratt & Whitney R-1830-75's more efficient in the DC-3. The Esso ship averages about 105 gals. per hr. for gasoline consumption at a cruise setting of 2,150 rpm. and 31 ins. instead of the 120-125 gph. formerly consumed. These Dash 75 engines are rated at 1,350 hp. each for take-off, but maximum power is not used, being necessary only in case of single-engine needs.

Many other valuable safety factors were provided in the conversion. The retractable tail wheel and extra-fast-operating gear, for example, also contribute to single-engine climb from take-off in an emergency. Both were adapted from the Super DC-3 evolved by Douglas. Extra load margins and more dependable braking are provided by Super DC-3 axles and new Goodyear wheels and single-disc brakes. Gear retraction takes but 6 seconds and the retractable tail wheel operates off the main gear selector valve.

Still another safety factor is provided by the first Jato installation in an executive DC-3. Racks for two bottles, each giving 12 seconds of thrust, were installed in the belly aft

(Continued on page 34)

Esso Shipping's Aviation Manager E. W. Estelle points to shackles for first executive DC-3 Jato.
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)



Custom panels above and below indicate Esso ship's pace-setting radio installation. Note special panel behind throttles for Collins ILS, omni, ADF, RMI (all dual) and Zero Reader. Details are described in this article by Carl Fox of Associated Radio, which made the installation.
—(Executive Aircraft Service Photos.)

Esso's Radio Points the Way

By CARL FOX
Associated Radio, Love Field, Dallas

VIRTUALLY all of the important strides made by the finest aircraft radio developments since the war make Esso's new C-47A conversion unique among executive transports. Not only is it the first to incorporate so many modern radio refinements in one "package," it is equipped with dual installations to an extent unattained in other conversions. A true all-weather transport, its equipment is a model of planning and preparation by Col. E. W. Estelle, chief pilot and aviation head of Esso shipping.

Equipment items include the following:

DUAL COLLINS 51R-2 VHF RECEIVERS, INCORPORATING OMNI-RANGE, ILS LOCALIZER AND COMMUNICATIONS FACILITIES. Crystal-controlled, these receivers provide reception over 280 channels, every 10th megacycle between 108 and 135.9 megacycles being a channel. Collins features in these sets include the provision of automatic ADF on VHF signals, and with the 51R-2 the pilot can set up on the course selector a predetermined course or track which can be flown by reference to deviation indicators, while the ADF feature shows the station's relative position. In addition to carrying out the dual theme for continued operation in event of failure of one set, the use of these two items also provides for flying an omni-range on one and a localizer beam on the other.

DUAL COLLINS 51V GLIDE SLOPE RECEIVERS. These are slaved to the 51R-2 receivers to give automatic selection with ILS channels. The 20 channels of glide path frequencies covered by the 51V's include all now operating and all proposed for operation.

SPERRY ZERO READER AND SPERRY C-2 GYROSYN COMPASS. More efficient pilotage and low approaches are made practical by this equipment, which more and more executive transports are adapting to their all-weather needs.

COLLINS 18S-4 100-WATT HIGH FREQUENCY TRANSMITTER WITH RECEIVER. This provides 20 channels covering 2-18 megacycles for long-range communications and ship-to-shore telephone.

BENDIX MN-53B MARKER RECEIVER for aural as well as visual identification of station markers.

ARC-1 VHF TRANSMITTER AND RECEIVER of about 10 watts, modified for 20 channels. Our modification of this makes use of the guard channel, which is normally removed, for reception on 122.2 mc. for those range stations using it for replies. It automatically receives on both 122.1 and 122.2 while being set up for transmission on 122.1. Otherwise the operator would have to switch from Point 1 to Point 2 for those stations utilizing the latter for replies.

COLLINS 17L-2 VHF TRANSMITTER of about 10 watts, crystal-controlled

(Continued on page 36)

for quality aviation instruments...

...specify Sperry

The entire fleets of DC-6B passenger transports in the Pan American and Panagra services will fly with Sperry instruments. These instruments complement one another, making it possible for the human pilot to uphold his line's reputation for safe, smooth, comfortable, enjoyable on-schedule flights in all weather and conditions of visibility.

In its dependable minimizing of flight hazards and delays, Sperry equipment reflects both the Company's 40-year experience in the aviation field and the effective service and world-availability of Sperry field engineers.

All over the world, aircraft of every type – commercial and military – are getting top-quality performance from the top-quality equipment designed and manufactured by Sperry.

Gyropilot, Gyrosyn and Zero ... Sperry trademarks, Reg. U. ... Engine Analyzer is manufactured ... under John E. Lindberg, Jr. Pat. No. ... Other U. S. and foreign patents pending.

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IN CANADA – SPERRY GYROSCOPE COMPANY OF CANADA, LTD., INTERNATIONAL AVIATION BUILDING, MONTREAL

(Continued on page 38)

1. *A-12 Gyropilot Pedestal Controller.* The A-12 Gyropilot provides complete automatically-stabilized control of the aircraft through all weather. The Pedestal Controller enables the human pilot to make coordinated turns and altitude changes by slight finger motion while the aircraft is completely gyro-stabilized even in rough air. Rates of turn, climb or descent are automatically maintained.

2. *A-12 Automatic Approach Controller.* With this standard accessory the A-12 Gyropilot automatically guides the aircraft to the runway with signals received from the instrument landing system.

3. *Zero Reader.* The Zero Reader is a simplified gyroscopic indicator which pieces together attitude, altitude, heading and radio path information. It shows the pilot instantly and continuously whether he should steer left or right, or go up or down . . . relieves him of complex mental calculations on approaches or landings.

4. *C-2 Gyrosyn Compass.* The C-2 Gyrosyn Compass is a Directional Gyro synchronized with the earth's magnetic field by means of a Flux Valve. This instrument . . . a gyro-stabilized compass in effect . . . gives accurate magnetic heading, requires no resetting and provides stable directional indication under all conditions of air turbulence.

5. *H-5 Gyro Horizons.* By means of a miniature airplane and gyro-activated horizon bar, this flight instrument shows the pilot what he would see if he had good visibility outside—whether the plane is banking, climbing, gliding or flying level. The H-5 Gyro-Horizon is non-tumbling and requires no caging.

6. *Engine Analyzer Indicator.* Its graph-like patterns give the flight engineer a continuous visual analysis of each engine during flight . . . instantly detect, locate and identify any irregularity in engine operation. Upon landing, the flight engineer hands ground crew complete data on parts in need of servicing, thus making possible frequently spectacular savings in maintenance time.

7. Zero Reader Heading Selector.
8. Zero Reader Selector Switch.
9. Zero Reader Control.
10. C-2 Gyrosyn Compass Amplifier.
11. C-2 Gyrosyn Compass Flux Valve.
12. Engine Analyzer Synchronizing Generators.
13. Engine Analyzer Cycle Switch.
14. Engine Analyzer Condition Switch.
15. Engine Analyzer Power Supply-Amplifier.
16. A-12 Amplifier.
17. A-12 Automatic Approach Amplifier.
18. A-12 Vertical Gyro Control.
19. A-12 Gyrosyn Compass Control.
20. A-12 Pilot Engaging Control.
21. A-12 Servo Control.
22. A-12 Rudder Servo.
23. A-12 Aileron Servo.
24. A-12 Elevator Servo.
25. A-12 Elevator Trim Tab Servo.
26. A-12 Flux Valve.

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It's well to remember that aircraft and aircraft engines suffer ailments similar to your automobile and its engine in extremely cold or icy weather, therefore requiring a similar amount of vigilance and care in their Winter operation and maintenance.

Man is constantly successfully defying nature and all its vicious elements. The BEECHCRAFT CERTIFIED SERVICE STATIONS over the nation are prepared and equipped to **WINTERIZE your Beechcraft** for the extreme winter conditions of the coming months. Beechcraft factory trained technicians who know just what your Beechcraft needs to assure maximum utility offer you the benefit that comes from specialized experience, the kind of experience that will save you valuable time and money.

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Atlantic Aviation Service
New Castle County Airport
Wilmington, Delaware

Atlantic Aviation Corp.
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(25 minutes from Times Square)
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Butler Co., Aviation Division
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Currey Sanders Aircraft Co., Inc.
Downtown Municipal Airport
Shreveport, La.

Francis Aviation
Capitol City Airport
Lansing, Michigan

Gray Aircraft Svc. Co., Inc.
D. A. Cody, Service Mgr.
Love Field, Dallas, Texas

Harte Flying Service
Municipal Airport
Wichita, Kansas

Hunter Flying Service, Inc.
Hunter Field
Cedar Rapids, Iowa

Ohio Aviation Company
Dayton Municipal Airport
Vandalia, Ohio

J. D. Reed Co., Inc.
Municipal Airport
Houston, Texas

Roscoe Turner Aeronautical Corp.
Municipal Airport
Indianapolis, Ind.

Tradewind Airport Corp.
Tradewind Airport
Amarillo, Texas

Tulsair Distributors, Inc.
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Ambler, Pennsylvania

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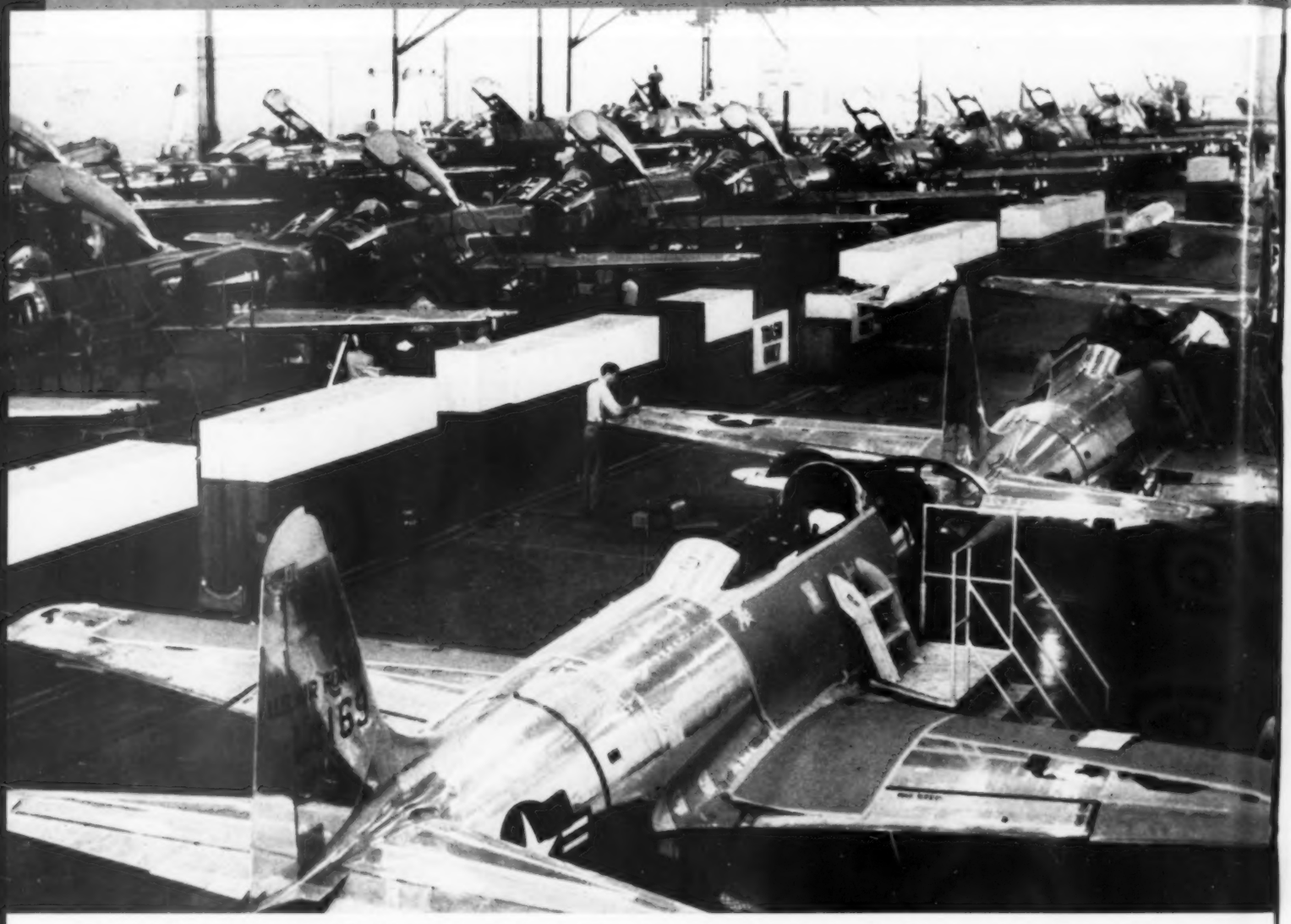
BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



ROUND-THE-WORLD JET TRAINERS are being delivered in growing numbers from the Lockheed factory at Van Nuys, California, where T-33 jet trainers are produced. They are going abroad to France, Greece, Turkey, Portugal and other areas yet to be announced as well as to U. S. services. —(Lockheed Photo.)

AIR REPORT

(Continued from page 7)

Aviation Service Company at Los Angeles, headed by Eddie Bellande, will install custom interiors in them. Two 340's have been ordered by Arabian American Oil Company (Aramco) and one each has been ordered by the Texas Company and Pratt & Whitney Aircraft.

CONVERSION OF SURPLUS MARTIN B-26 MARAUDERS INTO EXECUTIVE TRANSPORTS having pressurized cabins is being studied by the aviation division of a Texas petroleum industry firm which would use the B-26's for private transportation. Project calls for considerable engineering of major changes.

DE HAVILLAND DOVES ORDERED BY U. S. FIRMS total 22.

WHY'S AND WHEREFORE'S OF AVIATION OXYGEN were discussed at a recent clinic at the plant of Scott Aviation Corp., Lancaster, Pa., leading producer of oxygen equipment for airplanes. Scott distributors were represented by the following in attendance: Wes Hall, Lou Tucker, Barney Grannan, Frank Bohling, Bob Hughes, Irving Ackerman, Bud Bari and Lane Conine, all of Air Associates; H. L. Brown of Southern Oxygen Co.; Don Horn of Memphis; Harry Mitchell and Larry Zygmunt of General Aircraft Supply, Detroit; Brian Riley and J. Bellamy of Canada, and John Palmer of Washington, D. C. —(Scott Aviation Photo.)

DELOS W. RENTZEL has resigned as Under-Secretary of Commerce for Transportation. The ex-CAB chairman and former CAA administrator has not announced his plans.

SOUTHWEST AIRMOTIVE has established an annual scholarship to be awarded a Dallas high school graduate for a 2-yr. course at Arlington State College's School of Aeronautics, Arlington, Texas. Training will include business administration as well as aircraft engine mechanics.

PAUL BUTLER, president of Butler Aviation, which operates in Chicago and Washington, has been named administrator of the newly-created "Defense Air Transportation Administration."

NATIONAL AVIATION TRADES ASSOCIATION OFFICERS elected at last month's annual NATA convention in Fort Worth were: Robert Northington of Winston-Salem, N. C., president, succeeding John Griffin of Boston; Joe Hance, Wyandotte, Mich., and Harlan Herrin, Helena, Montana, eastern and western vice presidents, respectively, and Dave Finger, Armonk, N. Y., treasurer. Charles A. Parker is executive director. ★ ★ ★

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WOOD-RIDGE, NEW JERSEY

DOUGLAS MULTIPLEX AD-5 SKYRAIDER NAVY BOMBER is produced on a "universal chassis." Aboard carriers, the attack bomber may be easily converted, says Douglas, to a dozen different combat types according to changing combat requirements.
—(Douglas Photo.)

Airmen's Calendar

Dec. 17—15th Wright Brothers Lecture, U. S. Chamber of Commerce Auditorium, Washington, D. C., and Wright Memorial Dinner, Statler Hotel, Washington, D. C.

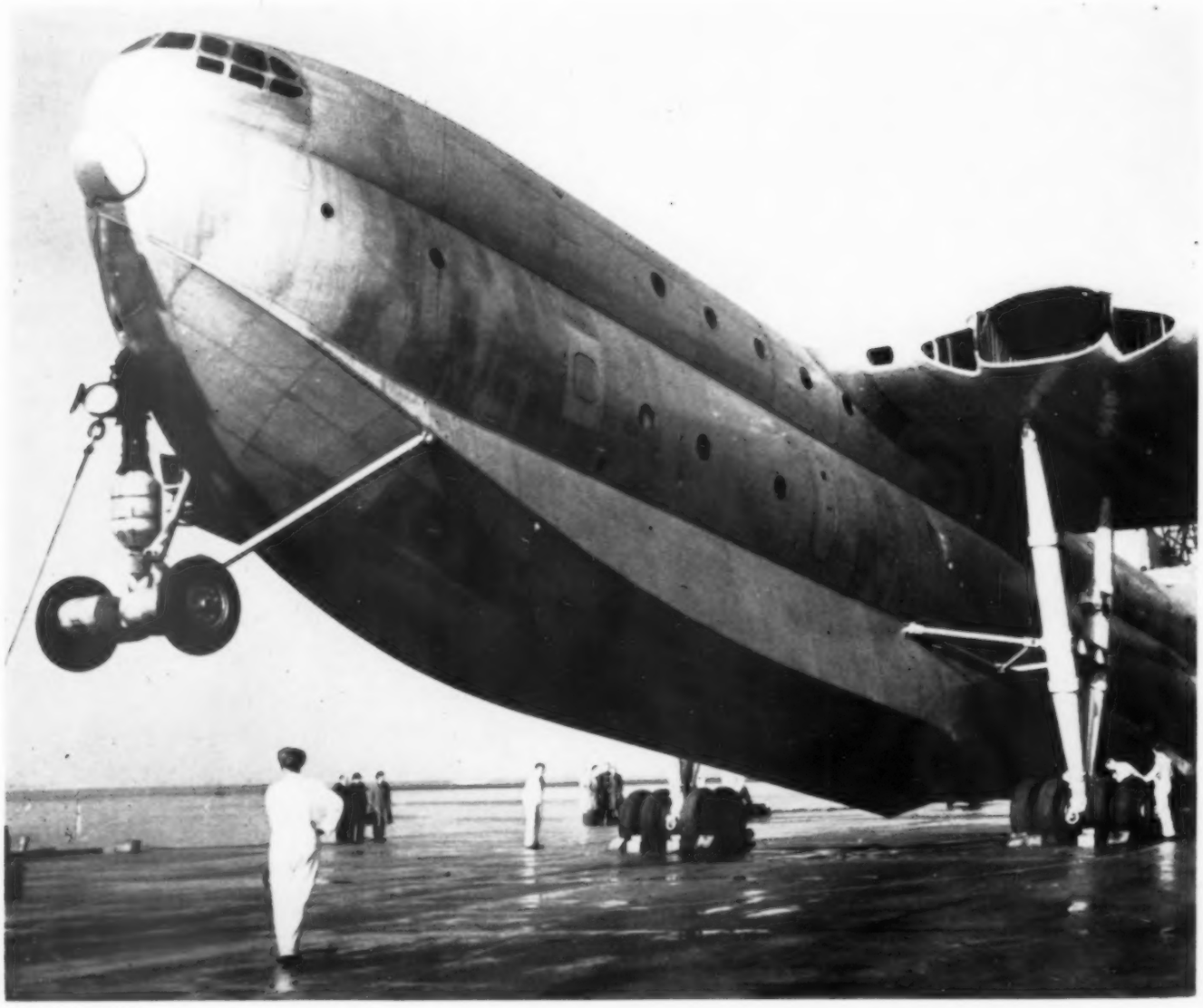
Dec. 17—Wright Memorial Luncheon; address by Major Alexander P. de Seversky, Hotel Carolinian, Nags Head, N. C.

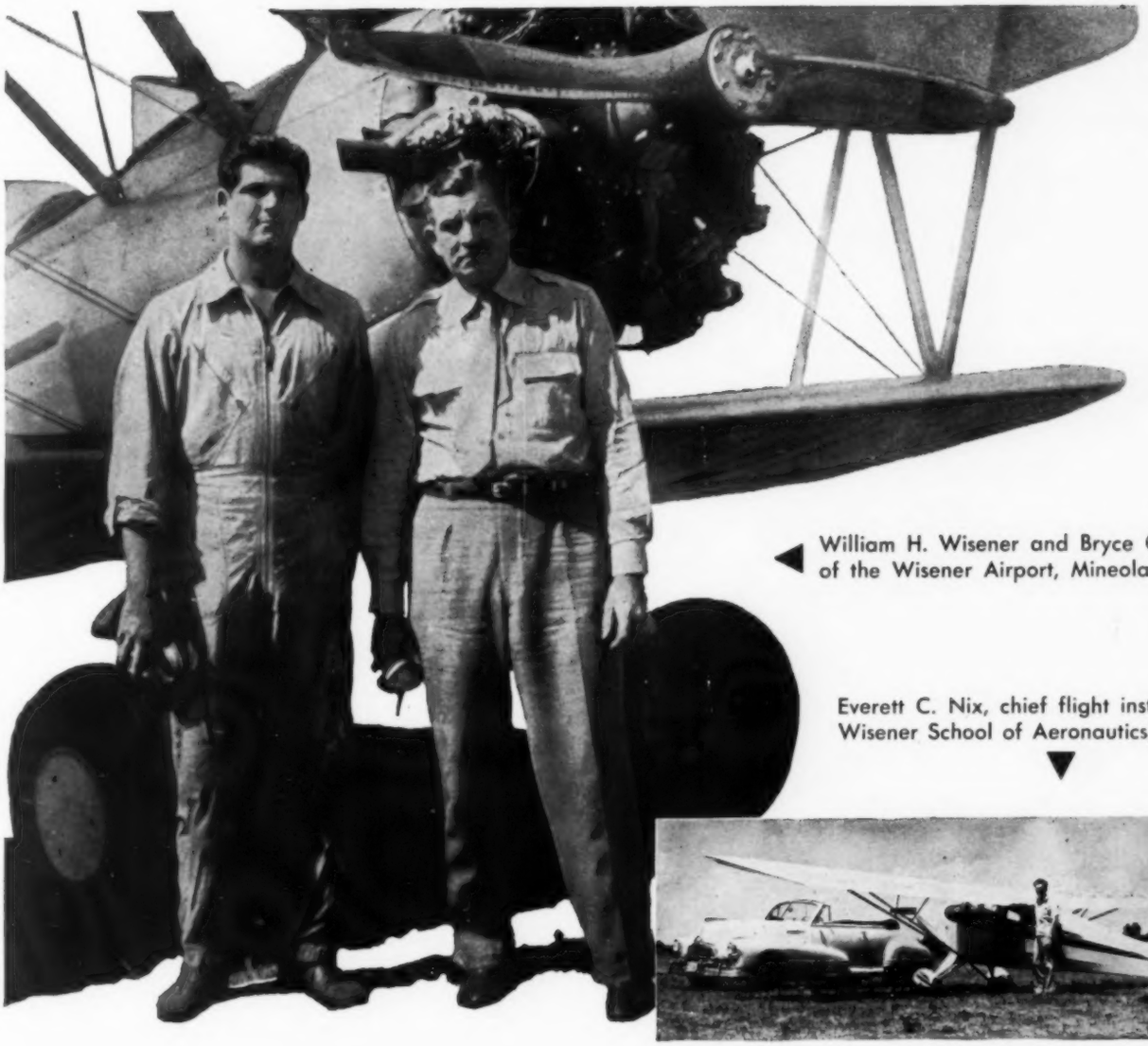
Jan. 5-6—Annual Miami Air Show, conducted by Florida Air Pilots Association, Opa Locka Airport.

Jan. 6-8—Cessna Annual Sales Meeting for Distributors, Allis Hotel, Wichita, Kansas.

Jan. 28-Feb. 1—Institute of Aeronautical Sciences 20th Annual Meeting, Hotel Astor, New York.

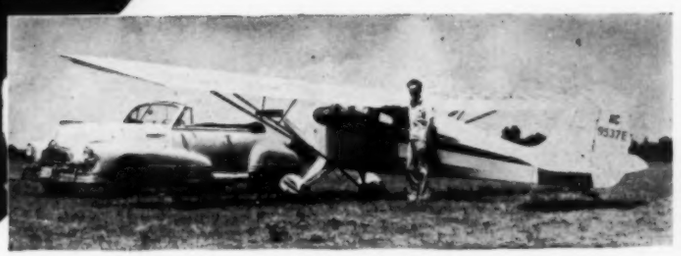
MAMMOTH BRITISH FLYING BOAT appears all nose as it is transferred from its construction hangar to a concrete launching apron where finishing touches will be applied. It is the 140-ton Saunders-Roe "Princess," powered by 10 Bristol Proteus turbo-prop engines. RAF will operate it as a troop carrier. Princess will carry 200 men a non-stop distance of 3,500 miles.
—(British Information Services Photo.)





◀ William H. Wisener and Bryce C. Wisener, of the Wisener Airport, Mineola, Texas.

Everett C. Nix, chief flight instructor at the Wisener School of Aeronautics, Mineola. ▼



MINEOLA SPROUTS WINGS

Next time you're flying between Dallas and Shreveport, La., drop in for top-grade service at the Wisener Airport, Mineola, Texas. William and Bryce Wisener are a couple of fellows whose enterprise and foresight built a big aviation business in a small town by *selling* aviation to their neighbors. With an aggressive sales program, sound business practices and products, they made the community air-minded—to the benefit of both the community and the Wisener Airport and School of Aeronautics.

The Wiseners, like scores of other leading airport managers in Texas, deal exclusively in Humble-Esso aviation fuel and lubricants. They offer careful, competent service and good facilities, along with the complete line of Humble-Esso products—a combination that assures any venture of success!

Pay the Wiseners a flying visit soon; fill up with the famous Humble-Esso products that are *first with flyers in Texas!*

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HUMBLE AVIATION PRODUCTS

HUMBLE OIL & REFINING COMPANY

Close cooperation between USAF and CAP is illustrated by this scene in which an Air Force lineman gives a prop to a CAP member's Mooney Mite while an Air Force mechanic checks the ignition during a SARCAP mission. Pilot is business man doing search work on day off.
—(Texas Wing CAP Photo.)

Civil Air Patrol Cadets are part of SAR-CAP missions, operating vital communications. These check search planes on and off the runway.
—(Texas Wing CAP Photo.)

NEEDLE IN A HAYSTACK

(Continued from page 17)

285 volunteers for the practice consisted of 130 pilots, 100 observers and 55 ground personnel, the latter made up of ground traffic controllers, communicators, plotters and clerks. A total of 420 hours were flown, 202 of which were on actual search of the 6,400-square-mile search area.

It was a week-end mission, with two hours of ground instruction and briefing of crews on Saturday afternoon. The simulated problem involved a civilian pilot with engine trouble. All they knew about him was a weakness for fishing and the general area of his flight—with no flight plan. Scores of possibilities were studied and all clues, as usual, led to no concrete determination, a condition SARCAP officials say is usually the rule rather than the exception in actual cases. On Sunday morning before take-off it required only forty minutes of final briefing, assignment of specific search areas, filing of flight plans and getting the 100 airplanes into the air. This was truly a remarkable achievement for a hodge podge of typical civilian pilots, young and old, men with thousands of hours and others with only a few hundred. The first plane got off the ground at 09:15 and the target was located at 12:31. The total operation was secured at 15:15 when the last plane returned to base.

On such practice missions an Air Force officer is stationed alongside the target and when a search plane approaches he tries to attract attention by using various signals such as reflecting mirrors or building fires. If pilots do not fly according to their assigned grid their number is taken down and it is counted against them on the grade sheet, which is tabulated after the mission is over for the entire operation.

Experienced search and rescue officers admit that their biggest problem is the percentage of "eager-beavers" who simply won't follow instructions and fly according to assignment. Somehow they get a notion that their original ideas about flying a pattern are better than official instructions. Perhaps the careful combing of an area gets boresome and their impatience to cover more territory in less time results in haphazard coverage. Happily this tendency is more marked on simulated missions than on actual searches. Officials believe that the problem will be minimized with more practice missions, which after all are now only in the second year under U. S. Air Force control and direction. Previously, training was carried out only at the CAP local level.

Search and Rescue is everything the name implies. The CAP'ers bear down heavily on Red Cross first aid and are organized to carry out rescue missions after the lost is found.

Training for Wartime Projects

In addition to the pure aspects of yeoman service—work that someone has to do, work that spares critically-needed military pilots for more military operations—SARCAP missions create an ever-ready pool of competent search pilots and observers who might conceivably be needed and used in time of combat for coastal and anti-sabotage patrol. Aerial reconnaissance is a highly developed art and science that requires schooling and experience just as any other specialized aeronautical vocation. You don't just go up and fly around hither and yon—

FCDA-CAP Reach Agreement

THE Federal Civil Defense Administration and Civil Air Patrol announced last month a cooperative plan and policy whereby CAP Mobile Support Units will be available to State Civil Defense directors for emergency duties and practice missions.

CAP Wing Commanders will submit reports to State Civil Defense Directors on the number and location of CAP-MSU's; amounts, location and types of equipment available; number of personnel by team specialty such as rescue, medical, messing, etc. Typical MSU's are made up of from 90 to 100 CAP personnel in air and ground echelons. An air echelon has 15 light airplanes, 17 pilots and supporting elements such as maintenance and servicing. The ground echelon handles communications, first aid, radiological, rescue and messing.★★★

Satisfaction that Counts!

from leaders in the industry

CESSNA owners recognize the Cessna Sign of Service because Authorized Cessna Service Operators from coast to coast display it proudly. Behind this sign stands their integrity as leaders in their field—backed by the integrity of Cessna Aircraft Company as leader of its field.

From the Authorized Cessna Service Stations listed below you get factory-approved quality standards in repairs and maintenance, parts and accessories. Flat rates are yours, too—ask your Authorized Cessna Service Operator to show you his thorough and accurate flat-rate manual. He'll welcome the opportunity and will gladly tell you how his rates for maintaining your Cessna are established. What is more, he will stand behind every job analysis he offers—your assurance that skill and efficiency are at work for you.

For dependable service wherever you are, remember the Authorized Cessna Service Operators listed below. There's one nearby.

These progressive Cessna Authorized Service Shops offer flat-rate service.

Aircraft Sales Company
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Fort Worth, Texas

Champ's Flying Service
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El Paso, Texas

Clinch Flying Service
Municipal Airport
North Platte, Nebraska

Clinton Aviation Company
Stapleton Airfield
Denver, Colorado

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Mustang Aviation, Inc.
Mustang Airport
Dallas, Texas

Ragsdale Flying Service
Municipal Airport
Austin, Texas

Southwestern Skyways, Inc.
Ragle Airpark
Santa Fe, New Mexico

Kenneth Starnes Aviation Service
Adams Field; Little Rock, Arkansas

West Texas Flying Service
Midland Airpark
Midland, Texas

Yingling Aircraft, Inc.
Municipal Airport
Wichita, Kansas

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Radio Communications and Navigation Equipment

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you're a part of an efficient team, trained in the art of finding needles in a haystack.

At the present time conversations between CAP and high ranking military authority are being carried on in which CAP's wartime missions are being evaluated and assigned. It is understood on good authority coastal patrol missions are being given serious consideration in view of adaptability of trained civilian airmen and civilian aircraft to aerial reconnaissance at low altitudes, well below the effective range of line-of-sight radar equipment. Continental air defense is deeply concerned with the enemy slipping in under the screen.

In these days of blood banks going broke for lack of volunteer blood, and the U. S. Marines having to fill quotas with draftees, and the public apathetic toward civil defense, it's warming to find the old American volunteer spirit isn't entirely dead. SARCAP is a brilliant feather in CAP's cap. There are plenty of openings if you want to have a part in it. Who knows, they might be looking for you some day!

★ ★ ★

CANADIAN AIRLIFT

(Continued from page 19)

and fuel into Knob Lake. In addition, his aircraft during this same period moved 2,825 men and their gear in and out of that base and other camps where geologists, engineers, prospectors and construction crews were stationed, and serviced other air strips and camps between the northern terminus at Knob Lake and the southern hub on the St. Lawrence.

Cement by Air

The tasks performed by these airplanes are prodigious. For example, airlift was the only way to bring in 3,000 tons of cement to one wayside air strip for construction of a hydroelectric generating station. Flying this quantity of cement is cheaper than trucking it in even if roads existed, according to Hoyt.

When the two DC-3's were added to the fleet, it became more of an air freight operation than a bush activity. Airlift costs dropped from 73 cents to 5 cents a pound. When the big Fairchild Flying Boxcar was borrowed from the USAF, the airlift really became big. Fairchild's own test crews headed by E. R. (Dutch) Gelvin and Walter Hensley transported in the C-119 to Knob Lake some 2,031,905 lbs. of machinery. Hoyt's smaller planes had hauled in similar machinery, to be sure, but only after the big

pieces had been cut into sections and then re-joined by welding. The C-119 flew in big gear with little time lost for cutting and re-joining — such items, for example, as 14,000-lb tractors, 15,500-lb. Le Tourneau rooters, and major sections of 40,000-lb. shovels and Caterpillars.

"It makes me go off wishing," Hoyt remarked to Paul Fisher, United Aircraft Corporation writer who visited the operation recently. "Big planes carry three, four, ten times the load. They did it twice as fast. That means they make two to three times the trips because they're easily turned around in loading and unloading. The only balm is to remember that some day we'll have them, and I suppose if they're turbine-powered, we'll curse because they should have had ram jets or rockets."

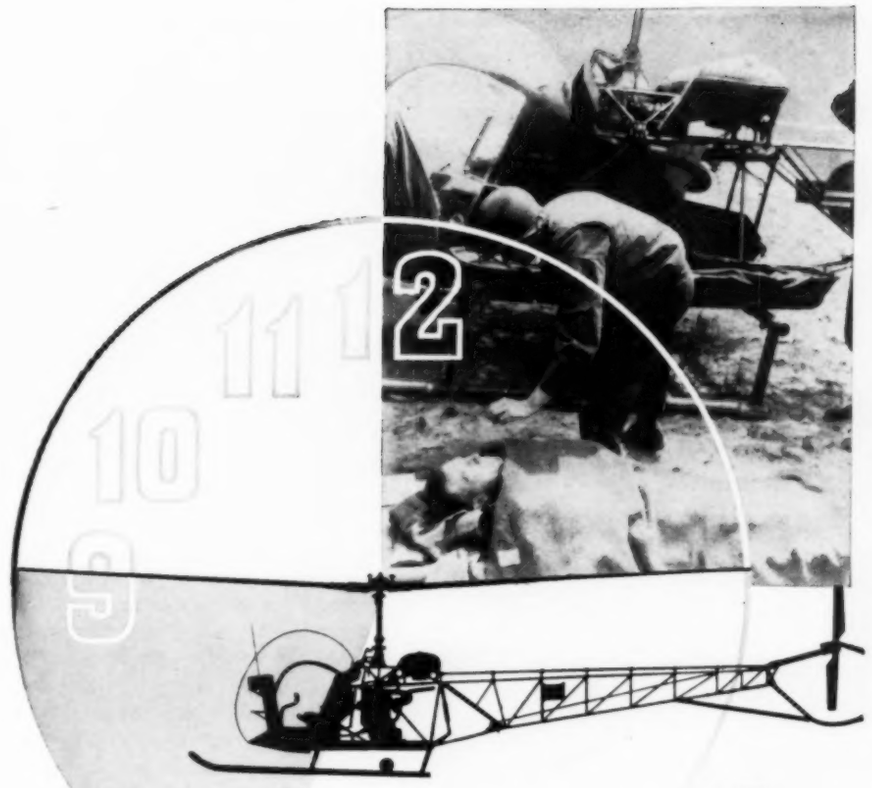
No Accidents

But Hoyt has been doing all right with the tools at hand, according to Fisher. In 2,595 air trips, the airlift carried some 21,000,000 lbs. of material and more than 14,670 men in and out of the iron ore camps. His planes averaged only slightly under 10 hrs. of utilization per day. His pilots logged 110 to 130 flying hours monthly in many cases. All this was accomplished in subarctic winds, storms and blizzards without a single accident.

Such a record demands scrupulous attention to maintenance and operational know-how. Canadian Pratt & Whitney Aircraft Co., Ltd., at Longueuil, performs all engine and propeller major overhauls.

"All of our things—airplanes, engines, propellers and other equipment —have proved themselves over the years by performance and dependability. Treat them right and they treat you right. For instance, we keep hearing about the mysteries of cold-weather operations from the military all the time. But what's mysterious about it? A Pratt & Whitney can be started and run smoothly, if you follow proper lubrication procedures and judgment, in temperatures from 135 above to 70 below. We have nearly all the modern flying aids—cross-wind landing gear, our own radio stations and beams, our own weather stations. So if we fly sensibly, we have no trouble."

That's the way Charlie Hoyt's airlift intends to continue operating—until the mining development's railroad is pushed into Knob Lake from the St. Lawrence. It will move out the tens of millions of tons of rich iron ore now being developed with airplanes. ★ ★ ★



A MATTER OF MINUTES

... BY HELICOPTER

In Korea, battle wounded often reach a hospital faster than a traffic accident victim in metropolitan cities.

Combat records show that combat casualties have been evacuated by helicopter to a batallion or regimental hospital within 20 minutes after being wounded. This remarkable "ambulance" service is the contribution of helicopters such as the H-13D and the HTL-4, built by Bell Aircraft for the Army, Navy and Marines.

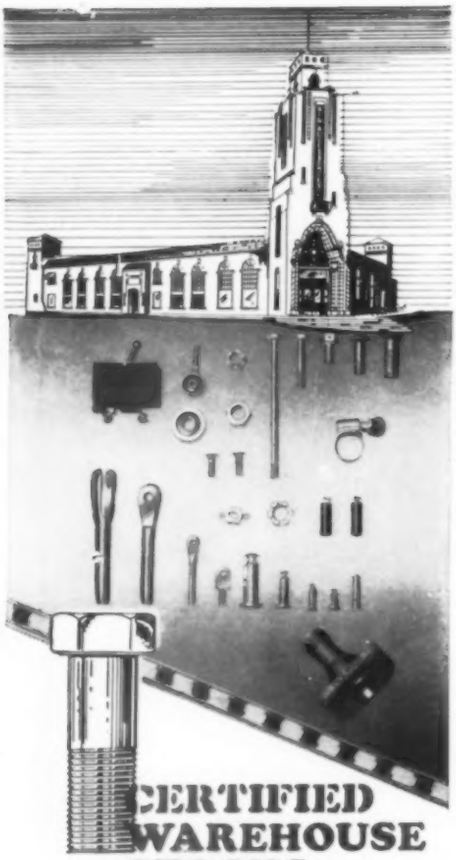
These maneuverable Bell helicopters are officially credited with saving the lives of 3,000 wounded U. N. troops in 6 months.

The majority were wounded so critically that evacuation by any other means could have been fatal.

While these helicopters have done almost the unbelievable...they are not robots. They need men to fly them. Army and Marine pilots continuously operated their helicopters dangerously close to enemy fire, repeatedly risking their own lives to help save the lives of others.

Bell Aircraft invites the application of qualified helicopter engineers.

BELL Aircraft CORPORATION



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BUSINESS FLYING

(Continued from page 21)

of the wing trailing edge. Only the small steel fastening hooks extend into the breeze, all other mounting and carrying structure being within the skin. Bottles are carried externally, but only when operating from fields at high altitudes where jet-assist would be needed in single-engine climb from take-off. Such fields include Denver during hot weather and South American airports in Colombia and Bolivia where airport elevations run as high as 12,000-13,000 ft.

"Jato is a safety factor we can not afford to be without," says the Colonel.

Flight safety is also emphasized in the Esso Three's new Edison fire detection and Kidde liquid-agent fire extinguishing systems. The new detector system is an advancement in that it is more reliable than earlier models and reduces if not completely eliminates false signalling. The new Kidde liquid-agent (bromochloromenthane) fire extinguishing system utilizes the natural advantages of a liquid in offering greater capacity for absorbing heat and in adhering to metal as compared with a gaseous agent such as CO-2. It also offers greatly increased discharge rates and saves considerable weight, since liquid agents such as methyl bromide are stored under only about 400 lbs. of pressure as compared with about 850 psi. for CO-2.

The Kidde system in the Esso Douglas includes four 54-lb. bottles, installed beneath the cabin floor. Discharge outlets are located in the nacelles (a) forward of the engine cylinders, (b) behind the cylinders, (c) at the accessory section and (d) in the wheel wells. They can be discharged selectively or simultaneously. In addition, the airplane has Aeroquip hose and firewall shut-off valves for all fuel, oil and hydraulic lines.

Dependability as well as safety is emphasized in the Esso Douglas by its new Sperry D-2 engine analyzer, first to go into an executive ship. In flight or on the ground checks can be made by "dialing" any cylinder on either engine to check its performance as registered on the Sperry's oscilloscope. Any 'scope-pattern departure from normal signals malfunction. Thus detected in flight, engine trouble is instantly and thoroughly analyzed so that repairs at the next stop can be quickly made without loss of time for searching or guess-work.

• "It keeps us in the air performing useful work," says Colonel Estelle. "The Sperry does our trouble-spotting electronically and without removing cowls, baffles and accessories by the old trial-and-error method of running

Track-mounted chairs in Esso DC-3 have sideways positioning for removable center-aisle table. These are 'chute-equipped chairs. Door closes off rear galley and vestibule from cabin.
—(Executive Aircraft Service Photo.)

down squawks. When the remedy is applied, it can be checked on the Sperry to double-check both the analysis and corrective methods used."

More time in the air means increased utilization. In this way the Sperry D-2 can be seen to pay its way. The same can be said for other features of the airplane. For example, the Colonel says the retractable tail wheel—first to be installed on an executive ship—reduces drag so effectively as to add over 5 mph. to the DC-3's cruising speed. This becomes significant when over 5 mph. is added to each of the 800 hrs. which this Esso Douglas will fly during the next 12 months. It figures to be a payoff of over 6,000 miles as a "free" bonus—free because from it Esso gets an extra transcontinental trip without spending one extra horsepower, one extra gallon of gas, or one extra dollar for power plant maintenance.

All of these 800 hrs. of annual utilization are not cruising, of course. But the percentage would be surprising, since the Esso Douglas is for long-distance travel, smaller transports being used for short hops. An idea of the distance between stops available in the Douglas can be had by considering another significant improvement which is an important "first" for this airplane: Auxiliary fuel tanks in the outer wing panels, installed after exhaustive and thorough engineering. This puts all fuel out in the wings where it belongs, rather than in the fuselage with the passengers.

Tanks in the DC-3 outer panels, engineered and pioneered by Esso in conjunction with Grand Central Air-

ESSO'S RADIO POINTS THE WAY

Full-size berth is concealed in headliner when not in use. It may be occupied during take-off, flight or landing. Three-place divan also makes into bed. This is in forward cabin compartment.
—(Executive Aircraft Service Photo.)

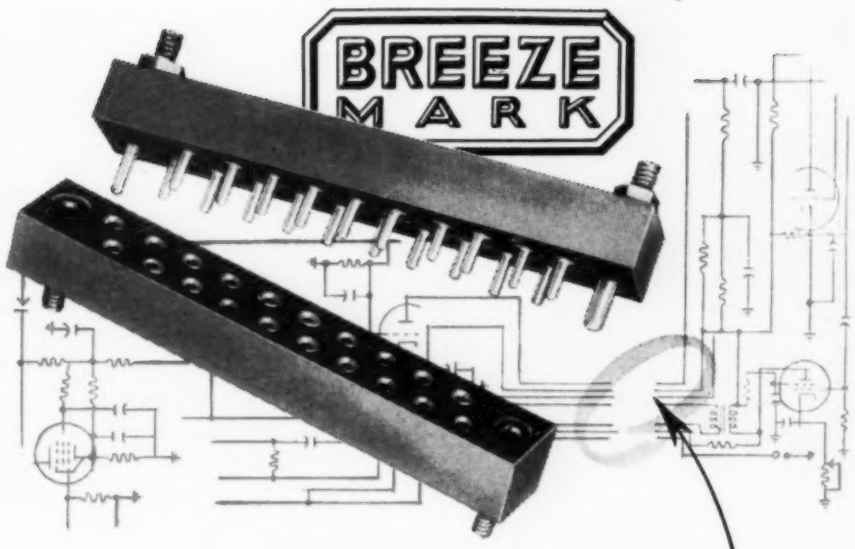
craft, develop a worthy philosophy for consideration in executive aircraft design. Why equip airplanes with minimum or compromised fuel capacity—why not provide for maximum range in the beginning, so that the operator can have available at any time a flexible load spread for most effective utilization? Longer non-stops not only increase the safety factor but save executive travel time, contributing directly to greater utilization. Here's progress — improvement in the utilization factor can make executive planes more and more indispensable to business and industry.

Long range means all-weather flying for the Esso DC-3. It is equipped for this more thoroughly than most airline transports, having such extras as the Sperry Zero Reader and the newest Collins radio developments for communications and navigation. This installation is described by Carl Fox of Associated Radio, who made the installation, in an accompanying article. Instrumentation and radio are completely dual. In addition, a battery-powered receiver, by-passing the electrical system and bus bar, is provided. This safety factor, like so many others, reflects Colonel Estelle's actual experience with "the improbable" and adds to safety and dependability for Esso flying. Grimes ring lights utilize red lighting for optimum night vision and eliminate instrument panel glare.

Anti-icing fluid tanks are installed in the wing fillets, being moved there from the cockpit floor as a safety item. Double the ordinary 6-gal. capacity is carried.

Cockpit roominess was also furthered by removal of the bulkhead be-

(Continued on page 38)



Connector Problem?

...We'll take it from HERE

Good ideas for electronic circuitry sometimes run afoul of connector problems. Maybe existing connector units won't hold air pressure gradients, won't stand the heat, aren't rugged enough for the job. Or maybe it's a question of altitude, or under-water application. But if you can sketch the circuit, we'll take it from there. We've engineered so many special connectors, solved so many "impossible" problems, that whatever the requirements are, we can usually provide the answer.

WRITE TODAY for specific information, or send us your sketches. We'll forward recommendations promptly.

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Job engineered, welded-diaphragm bellows.

Multiple contact connectors to meet government specifications.

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cabin speakers and paging system.

CRAFTSMAN CABIN RADIO for

trol heads on this panel have individual lighting.

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Also, we would like to say THANKS for the business given us during the past year. Your confidence in our service and products has been an inspiration to all of us.

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ESSO'S RADIO POINTS THE WAY

(Continued from page 21)

to cover 180 channels from 118 to 135.9 megacycles.

ASSOCIATED RADIO AR-100D ISOLATION AMPLIFIER. This eliminates interference between pilot and co-pilot headphone reception and also provides about 3.5 watts audio output for cockpit speakers, assuring adequate volume.

TWO BENDIX ARN-7 ADF's, equipped with MN-60 iron-core loops for greater effectiveness and less aerodynamic drag. These ADF's are tied into a Collins radio magnetic indicator (RMI) for azimuth presentation. The azimuth card rotates automatically by signals from the gyrosyn compass.

TWO TYPE 149-H INVERTERS to supply 400-cycle power to ADF's, Zero Reader, gyrosyn compass, and Collins ADF features. The inverters turn on automatically when any piece of equipment requiring them is turned on. They are equipped with a Sperry phase adapter for 3-phase power to the Zero Reader and gyrosyn. A selector switch allows use of one or the other inverter as desired to even up the wear on them.

BENDIX RA-10 GENERAL UTILITY RECEIVER covering 150 kilocycles to 10 mc. A multiple power source is provided for this set so that range reception is practically guaranteed in any event of difficulty. It is normally operated from the radio electrical system. It can also be operated from the aircraft electrical system or directly from the aircraft battery in event of failure of the electrical system. This battery connection is by independent wiring which by-passes the bus bar so that its failure would not affect the standby receiver.

STROMBERG-CARLSON 25-WATT AUDIO AMPLIFIER for

Dual radio installation includes provision of two Collins glide slope antennas in Esso DC-3.
—(FLIGHT MAGAZINE Photo by Tom W. Collins.)

If you fly X-country

... you should know that omni now is nationwide ... three hundred omni-range stations blanket the country ... you can plan your flight from coast to coast on omni-ranges. NARCO's Omnihomer is your best buy for crystal-clear 2-way VHF with omni. It is designed for both small and large aircraft owners ... simple to install ... safe and relaxing to operate and you can never be lost. NARCO's Omnihomer is priced at only $450.00 plus tax.

Leighton Collins, Editor of Air Facts, has logged a comprehensive story, "5000 Miles by Omnigator," in Air Facts Magazine. He states, in summary, "A cross-country exploration and study of our elaborate omni-range and ILS facilities reveal that the system is incredibly good and that, for the first time, the small plane owner has something he can rely on in fair weather or foul, high or low, and especially in thunderstorm areas."

For a complimentary copy of this Omnigator story, write NARCO.

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Perfection in electronics

cabin speakers and paging system.

CRAFTSMAN CABIN RADIO for both broadcast and FM reception, modified to operate on 28 volts and powered by a small dynamotor instead of the usual vibrator or transformer. One interesting feature is that the cabin speakers can be switched to the co-pilot's reception and transmission. Cabin reception can also be heard by the pilots. Pilot paging cuts out cabin radio programs, assuring that paging will be heard in the cabin. Four 12-in. permanent-magnet speakers are installed in the cabin, with individual switches.

RCA AVQ-6 RADIO ALTIMETER, successor to the wartime military model for absolute readings.

TWO INTERPHONE STATIONS, one in each cabin compartment. The one in the forward compartment can be used for ship-to-shore radio-telephone.

TWO SPERRY REPEATER AMPLIFIERS for the gyrosyn compass signals before they are fed into the Collins equipment.

Custom-made selector switch boxes are on each side of the cockpit, tilted at a 20-degree angle to improve visibility for ready reference. These, as are other custom panels in this airplane, are edge-lighted Lucite, having a special crinkle finish with the engraved letters filled with transparent white. The letters are red-lighted for night visibility, and each panel has its own brilliance control.

A custom pedestal radio control panel houses all volume controls and function controls for the two ADF's and the RA-10 utility receiver.

A custom radio instrument panel located between the throttles and the main instrument panel was installed in keeping with the desire to retain the A-3 autopilot. On this panel are the two Collins deviation indicators, the two Collins omni course selectors, RMI's for the VHF and LF ADF's, the Zero Reader bearing selector, the Zero Reader indicator, and the MN-53 marker lights.

The custom overhead radio control panel includes edge-lighted crackle-finished Lucite for the ARC-1 and Collins 18S-4 controls. All other control heads on this panel have individual lighting.

An innovation incorporating worthy safety provisions is the sectionalization of the copper bus bar along the backs of the circuit breakers. There are four sections in the bus bar, with flexible connections. This is to allow for expansion under heat and for ease of servicing. In addition, new type Square D circuit breakers, Type 3161-P, glow in the dark when popped out for ready identification. These breakers have a pull-out feature—pulling out a breaker turns off individual equipment for maintenance.

A master solenoid turns on or off all radio gear. It has two primary cables feeding circuit breaker buses. In case of a damaging short on one side, power is fed through the other cable.

Harold Lamm, Esso mechanic, made certain revisions for improving the servicing and maintenance of the radio equipment.

Skin Used as Antenna

Antennas include the grounding of the antenna for the Collins 18S-4 to the tail fin at the far end. In effect, this forms a large "loop" to utilize the ship's skin as part of the antenna. Decided improvement in range is the result.

Only one ram's horn is used for both omni sets. This elimination of an extra ram's horn with its drag was accomplished by providing varying lengths for the cables to minimize interference.

Two Collins 37-P glide slope antennas on the nose of the aircraft provide assurance of reception in case one is damaged on the ground by ladders or other ramp equipment. Improved distance reception is provided by this Collins antenna design.

Omni reception, incidentally, has been extended considerably in the newer Collins equipment installed in the Esso Douglas. This includes very good reception of omni signals 100 miles out at about 4,000-ft. altitude, and up to 250 miles or more of range from an altitude of 10,000 ft., all depending on terrain.

(Continued on page 42)

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Announcing the CONTINENTAL-TURBOMECA Family of GAS TURBINE ENGINES

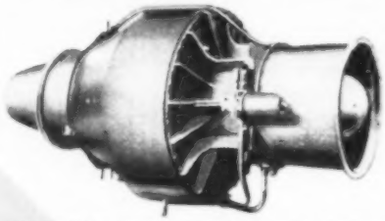
CONTINENTAL MOTORS · Powerful as the Nation · AMERICA'S STANDARD

Continental Motors, pioneer in power for business and utility aircraft, announces another major pioneering step—its purchase of the exclusive United States manufacturing rights to a series of gas turbine models developed by the Societe Turbomeca, under sponsorship of the French Air Ministry.

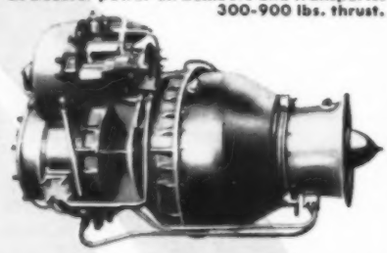
The agreement with Turbomeca, climaxing months of technical work, testing and negotiation, in this country and in France, brings to the United States a far broader and more diversified line of turbines, in the 200-to-1,100 h.p. range, than has been available heretofore. Characteristics forecasting their widespread use include:

- **Small size and low weight in relation to power.**
- **Adaptability to all fuels, including those of low grade.**
- **Long life expectancy due to absence of reciprocating parts.**
- **Minimum use of critically scarce materials in their manufacture.**
- **A high degree of parts interchangeability among various models.**
- **Versatility. Useful power is delivered in any of four different ways.**

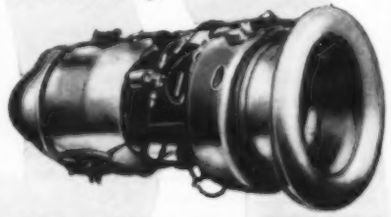
Continental Motors sees this Continental-Turbomeca family of engines as supplementing, rather than displacing, power plants of conventional design. The four basic models and their variations are expected to find wide acceptance, not only in military applications, but in many commercial fields as well.



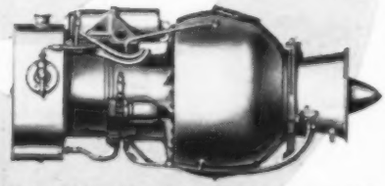
JET POWER for target and trainer aircraft or as booster power on bombers and transports. 300-900 lbs. thrust.



SHAFT POWER especially suited for helicopters, utility aircraft, electric generators, etc. 225-400 h.p.



DUCTED FANS with wide potential utility as means of increasing speeds of small and medium-sized military and civilian utility aircraft. 500-800 lbs. thrust.



AIR COMPRESSOR supplying up to 2,000 cu. ft. of air per minute at 50 lbs. psi. Useful as starter for large aircraft turbines, as portable heater, or for operating pneumatic tools, particularly where lightness and compactness are required.

The Continental-Turbomeca family of gas turbines has been exhaustively tested in actual use. Plans for manufacture soon will be announced. Meanwhile, inquiries are welcomed. Please address Continental Motors Corporation, 1500 Algonquin Avenue, Detroit 14, Michigan—Attention Mr. Whitney Collins.

Continental Motors Corporation
DETROIT AND MUSKEGON, MICHIGAN

JET CHALLENGE

(Continued from page 15)

day 170-mph., piston-engine, 4-place airplane. Fuel consumption of the turbine-powered 4-place would be about 35 gals. per hr. but with the same aircraft weight the turbine model would have the same 680-mile range as the piston-driven model.

Cost and availability? Engineer Bachle estimates the 270-mph. 4-place turbine-powered airplane would cost about $22,000, or about $4,000 more than the 170-mph. 4-place piston-driven airplane he uses for comparison. "Availability," he says, "depends on the demands of the buying public." As to when such airplanes might be available, Bachle says it all depends on "how attractive the improvements offered are to the public." In any case, military use of small turbines will almost certainly precede commercial application. "A start has been made," says Bachle, "and the goals described are attainable today."

Observers may receive Bachle's lightplane turbine suggestions with skepticism. But one thing appears certain: Continental's turbine project is a challenge to the lightplane aircraft industry. When suitable power plants exist, somebody sooner or later will build wings around them—if for nothing else than to determine exactly how suitable the new engines really are.

★ ★ ★

BUSINESS FLYING

(Continued from page 35)

hind the pilot. Among other things, it allows room for a modified Warren McArthur pilot's seat, which reclines and can be moved up or down and fore and aft.

Transfer of the Janitrol Model S-200 combustion heater from the front to the empennage aft of the baggage compartment made possible location of the heater air intake in the vertical fin, greatly reducing drag. The heater is installed in stainless steel isolation and is equipped with an independent Kidde liquid-agent fire extinguishing system.

Cabin air conditioning is complete. Passengers or crew can obtain any desired temperature by setting a Minneapolis-Honeywell cabin thermostat. Two big blowers in the empennage provide ground circulation of cabin air. One moves 620 cu. ft. of heated or fresh air per minute, the other moves 200 cu. ft. of refrigerated air per minute. This latter blower operates through a chest containing 100 lbs. of chipped ice. It was developed from

Esso experiments with a DC-3 in Sumatra, where 300 lbs. of chipped ice was necessary.

Simplicity of furnishings distinguishes the Esso interior. Instead of the overstuffed plush so widely used in executive transports, Esso wanted its DC-3 cabin to retain the appearance of an airplane. It does—there are no coffee tables, floor lamps, ornate cabinetry, tables or other decorator items. Such paraphernalia is kept in storage closets and out of the way when not in use.

Two compartments make up the cabin. The forward one has two chairs, a full-size 3-place divan which can be made into a bed, and two full-size sleeping berths concealed in the headliner when not folded down for use either in flight, on take-off or in landing.

Eight swivel chairs are in the main cabin. All of the chairs are custom made by Executive Aircraft Service and have concealed Irving chair 'chutes. Static lines are concealed in the coat closet just behind the door.

An innovation is the adaptation of tracks for the chairs. These tracks, individual with each of the chairs, run cross-wise the cabin. This allows the chairs to be positioned from side to side toward the center aisle, where 4-place conference tables from storage can be quickly set up. This leaves an aisle on either side for other passengers, who may walk about without disturbing the tables.

Numerous lesser items—all reflecting experience from Esso's extensive flying and Executive Aircraft Service's four-score postwar conversions—contribute to making this DC-3 outstanding. Two picture windows, for example, are a DC-3 first, measuring 56 ins. long and 13 ins. deep and being located forward of the door. All other windows are over-size. The door with its built-in steps is hydraulically operated. The full-size door on the baggage compartment opens upward to provide a shelter. Hot as well as cold running water is available in the lavatory.

Ingenuity is especially resourceful in the galley, with its many features including warming ovens for food trays. A specially-engineered door seals off the galley to keep food odors from the cabin and headliner louvres provide ample galley air disposal.

From appearances, the Esso flagship is just another Douglas. But hidden beneath the surface are years of experience and a wealth of specialized skills, all aimed at making this the safest, most dependable business machine available for executive air travel.

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Questions and Answers for Airport Operators

The Long and Short of Airport Leases

QUESTION: I'd like to see something in your Question and Answer column regarding the length of term of leases on airports. So many people advocate avoiding long-term leases in the face of requests that seem perfectly reasonable for long-term leases. What are long-term leases, for instance? Certainly, no hard and fast rule seems to fit all cases.

ANSWER: We will try to answer your question by applying a common-sense yardstick. In no sense will we approach the question from the legal standpoint beyond pointing out that when a lease or agreement involving a public airport is executed it should meet any maximum term limitations prescribed for the public agency entering into the lease or agreement by state laws, local charters or ordinances.

Most people consider a lease of five years or under as a short-term lease and one ten years or more as a long-term lease. However, the line of demarcation is very flexible. The principal reason for advocacy of short-term leases lies in a feeling many airport people have that a long-term lease may extend beyond the time where conditions may be foreseen by one or both parties. This is especially true in a rapidly changing aviation picture. Yet there are some types of leases which, if limited to a short term, would be useless from the standpoint of the lessee. Such leases are principally those for land upon which the lessee plans to build substantial buildings, the investment in which cannot be written-off in a short period.

Before describing the particular characteristics of various types of leases as a determination of the desirable term, the first question to be settled is "What is the term of a lease?"

If a lease is for five years, specifying a starting date and a termination date without reservations or options beyond provisions for cancellation for cause, it may generally be considered a five-year lease. If, on the other hand, it is a five-year lease with an option granted to the lessee to renew for five years at his option alone, it is in effect a ten-year lease as far as the lessor is concerned since he has no way of limiting the lease to the original term if the lessee exercises his option and complies with all the covenants. On the other side, the lessee may terminate the lease by failing to exercise his option.

A lease or agreement for five years with a provision for renewal upon agreement of both parties may be no more than a five-year lease if there is a difference or conflict in the renegotiation. A twenty-year lease providing for renegotiation as to rates and rentals at stated intervals during the period of the lease would seem to a layman to be a twenty-year lease with apparently long and wearisome renegotiations a possible contingency.

When an option is given, it is reasonable to expect that the conditions under which the option may be exercised are clearly defined. When such a lease or agreement is executed with provisions for approval by any agency of the government or for subordination to an existing deed or agreement with the government, care should be exercised to make it clear that any option is subject to the same approval or subordination provisions.

Where the public agency has committed itself to any obligations, reservations or limitations by resolution, agreement, deed or commitment with

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ment may face the possibility of change in location in the structure the lessor may proceed with the neces-

a private entity or with a federal, state, county or other local government, the same care is necessary. This latter would be pertinent where there had been federal aid or gift which carried with it obligations to the public and to the government. All deeds or agreements of any sort should be scrutinized carefully to avoid violation of the terms of such documents when entering into new leases or agreements.

In any case, where there exists an obligation to secure approval of the lease or agreement by any agency of the federal government such as the Civil Aeronautics Administration, it is advisable to seek the advice of that agency early in the negotiations in order to avoid delay and revision.

Generally, leases and agreements fall into three classifications. First, those under which uses or services principally are provided. This type of lease or agreement is the one most commonly encountered in documents providing for landing fees. The second type is that which is entered into for space in structures whether the space be for portions of a building or for whole building units. The third type is that which involves the leasing of land for some purpose whether it be for the erection of structures by private investment or for agricultural purposes.

A lease of the first type may be either a long or short term lease but if it is a long-term lease for perhaps a period of twenty years, lessors generally feel that there should be provision therein for adjustment of fees or charges if conditions change materially during the life of the lease. This is especially important where the costs of the lessor are subject to fluctuations in material and labor.

Requests for long terms in such leases usually arise from a feeling on the part of the lessee that he should not leave himself in the position of having to face unwarranted frequent changes in his rate structure due to periodic change in public officials, and this is understandable. However, it is possible under the more autonomous board or commission type of management for policies to be so stabilized that this danger is lessened. The greatest danger in this type of lease lies in firm inflexible terms and conditions over a long period when economic conditions affecting costs to both parties may be in a continuous state of flux.

The natural trend then seems to be to make either short-term leases or to protect both parties in long-term leases against injury due to economic change by the use of safeguards and indices which enable adjustments to be made. For the second type of lease, dealing with space, it is generally considered desirable that they are for reasonably short terms and in this case a short term may be considered ten years or less. However, the type of space will have a great deal to do with the term. Many rental arrangements for rooms and floor space within a building follow customary local customs as to the rental of office space. Some are renewable year to year. The lessee has a right, it is believed, to expect to continue in occupancy on reasonable terms and conditions beyond the initial term of any short-term lease if his occupancy is satisfactory and his use of the space has a function which is useful to the public and the airport. People who do business on airports must expect consideration under which they may continue as tenants of the airport in a useful service even though they have a short-term lease. If that were not appreciated, many types of enterprises using airports could not afford to go into operation, especially if they expected summary displacement at the end of a short term.

Leases for hangar and shop space which involve expenditures on the part of the lessee to establish a business and to install equipment necessarily require a longer term than those where no expenditures were necessary. The best measurement of the advisability of a particular term of lease in such an instance may be found in a realistic evaluation of the investment to be made by the lessee and the term of years necessary to write it off at a reasonable annual rate.

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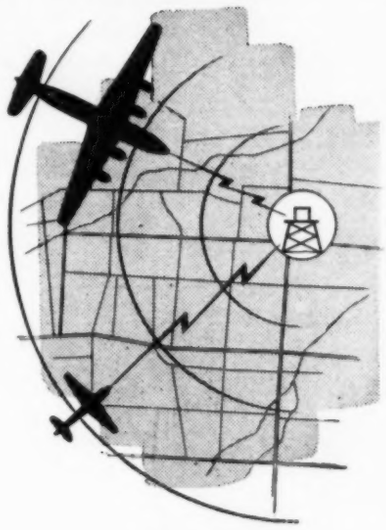

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ment may face the possibility of changing conditions requiring expansion of the landing field, runways, taxi strips, aprons or terminal buildings which may require alteration or change in location in the structure leased. This motivates for a short-term lease but a longer term can be given if provision is made for changing conditions in such a fashion that the lessor may proceed with the necessary moves and the lessee be indemnified against undue loss. This is especially pertinent where structures must be moved to a new location and equipment replaced.

The third type of lease involves land. If the land is to be used for agricultural or grazing purposes, normally a short-term lease is satisfactory to both parties. Even in such leases many airports require that if the land is needed for aeronautical purposes it may be withdrawn from agricultural use and the lease cancelled.

(To be continued next month.)

ESSO'S RADIO

(Continued from page 37)

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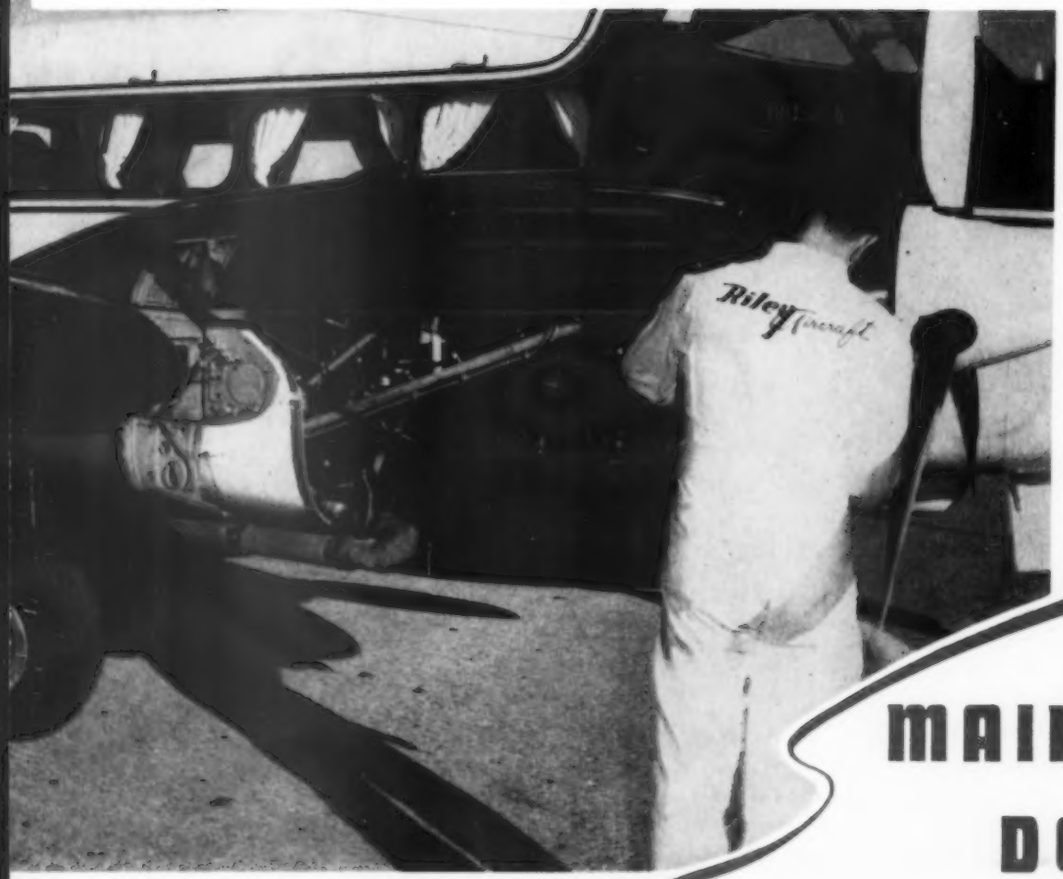

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